Transportation, Distribution, and Logistics (TDL) Contextualized Bridge Curriculum

Math Resources

TDL Math Outcome #1 - Activity 1

MATH ANXIETY SELF-IDENTIFICATION EXERCISE

People with math anxiety often experience difficulty and frustration while learning, taking a test, or answering questions in math class. Many of these people don't know they have math anxiety even though they suffer from it and its effects. Many math anxious people don't even want to know they have math anxiety. They often try to avoid what might upset them. Math anxiety can sometimes affect one or more areas of a person's life. For some people, taking a math course is enough to upset them, and for some people any type of test is a potential threat.

A main symptom of math anxiety of getting very nervous when it comes to attending a math class, taking a test, or encountering math in everyday life. Another symptom is avoiding contact with any potentially unpleasant math-related situation as much as possible.

Regardless of how the person with math anxiety feels, some can perform very well, but many do not. The ones who don't do well have often established a strongly formed habit of giving up or avoiding. This avoiding or giving up often mistakenly leads to the assumption that the anxious person lacks some ability to perform a task or reach some goal. If this assumption is not tested and corrected, these anxious people are condemning themselves to function at a level much below their actual ability.

This self-evaluation exercise is designed to help you look at yourself to see if you <u>do</u> or <u>do not</u> have math anxiety. If you find that you have math anxiety, then you are in a very lucky position. You are lucky because you will have the opportunity to do something about it now. By working on your math anxiety, you can rid yourself of that nervous feeling which you associate with certain tasks or areas of your life. Those people who learn how to deal with their math anxiety find that they not only feel better, but they often do much better with math than they ever expected!

REVISED MATH ATTITUDE SCALE
(Dutton)

Please mark the following statements to show how you feel about each one. The five points are: Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A), Strongly Agree (SA).

1) I am always under a terrible strain in a math class.

   SD D U A SA

2) Mathematics is very interesting to me, and I enjoy math courses.

   SD D U A SA

3) I do not like mathematics, and it scares me to have to take it.

   SD D U A SA

4) Mathematics is fascinating and fun.

   SD D U A SA

5) Mathematics makes me feel secure, and at the same time it is stimulating.

   SD D U A SA

6) My mind goes blank, and I am unable to think clearly when working math.

   SD D U A SA

7) I feel a sense of insecurity when attempting mathematics.

   SD D U A SA

8) Mathematics makes me feel uncomfortable, restless, irritable, and impatient.

   SD D U A SA

9) The feeling that I have toward mathematics is a good feeling.

SD D U A SA

10) Mathematics makes me feel as though I'm lost in a jungle of numbers and cannot find my way out.

SD D U A SA

11) Mathematics is something that I enjoy a great deal.

SD D U A SA

12) When I hear the word math, I have a feeling or dislike.

SD D U A SA

13) I approach math with a feeling of hesitation, resulting from a fear of not being able to do math.

SD D U A SA

14) I really like mathematics.

SD D U A SA

15) Mathematics is a course in school that I have always enjoyed.

SD D U A SA

16) It makes me nervous to even think about having to do a math problem.

SD D U A SA

17) I have never liked math, and it is my most dreaded subject.

SD D U A SA

18) I am happier in a math class than in any other class.

SD D U A SA

19) I feel at ease in mathematics, and I like it very much.

SD D U A SA

20) I feel a definite positive reaction to mathematics; it is enjoyable.

SD D U A SA

REVISED MATH ATTITUDE SCALE (DUTTON) SCORING

Read each item and decide if agreement with it expresses a positive or negative attitude. (see chart below)

If positive, score SA = +2, A = +1, U =0, D= -1, SD = -2.

If negative, score SA = -2, A = -1, U =0, D= +1, SD = +2.
Total the number values for the items and divide by 20.

This number should lie between 2 and -2, expressing, respectively, a negative to positive attitude.

0 indicates a neutral attitude.

Do not show scoring rules to student prior to responding.

Item #	Score	Item #	Score
1 – neg		11 – pos	
2 – pos		12 – neg	
3 – neg		13 – neg	
4 – pos		14 – pos	
5 – pos		15 – pos	
6 – neg		16 – neg	
7 - neg		17 – neg	
8 – neg		18 – pos	
9 – pos		19 – pos	
10 – neg		20 – pos	

TDL Math Outcome #1 - Activity 3

Ten Ways To Reduce Math Anxiety

1. **Overcome negative self-talk.**
2. **Ask questions.**
3. **Consider math a foreign language -- it must be practiced.**
4. **Don't rely on memorization to study mathematics.**
5. **READ your math text.**
6. **Study math according to YOUR LEARNING STYLE.**
7. **Get help the same day you don't understand.**
8. **Be relaxed and comfortable while studying math.**
9. **"TALK" mathematics.**
10. **Develop responsibility for your own successes and failures.**

Source: http://www.mathpower.com/reduce.htm

TDL Math Outcome #1 - Activity 4

Math Anxiety Code of Responsibilities

1. I have the responsibility to attend all classes and do all homework as assigned.

2. I have the responsibility to recognize the rights of others to learn at their own pace.

3. I have the responsibility to seek extra help when necessary.

4. I have the responsibility to see the teacher during office hours or to schedule an appointment for assistance.

5. I have the responsibility to come to class prepared; homework finished and/or questions to ask.

6. I have the responsibility to speak up when I don't understand.

7. I have the responsibility to give math at least the same effort I give to other subjects.

8. I have the responsibility to begin my math study at my current skill level.

9. I am responsible for my attitudes about my abilities.

10. I have the responsibility to learn about instructors prior to registering for class.

11. I have the responsibility for learning and practicing relaxation skills.

12. I have the responsibility to act as a competent adult.

13. I have the responsibility to approach math with an open mind rather than fighting it.

14. I have the responsibility to be realistic about my goals and expectations.

Source: http://home.capecod.net/~tpanitz/ccchtml/responsibilities.html

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Adding and Subtracting Integers

Find each sum.

1) $12 + (-5) =$

2) $(-14) + (-18) =$

3) $8 + (-28) =$

4) $43 + (-12) =$

5) $(-7) + (-11) + 4 =$

6) $37 + (-16) + 12 =$

7) $29 + (-21) + (-12) + 20 =$

8) $(-15) + (-25) + 18 + 25 =$

9) $30 + (-28) + (35 - 32) =$

10) $25 + (-15) + (44 - 17) =$

Find each difference.

11) $(-12) - (-8) =$

12) $15 - (-20) =$

13) $(-11) - 25 =$

14) $30 - (-16) =$

15) $56 - (45 - 23) =$

16) $15 - (-4) - (-34) =$

17) $(24 + 14) - (-55) =$

18) $23 - 15 - (-3) =$

19) $49 - (15 + 12) - (-4) =$

20) $29 - (-17) - (-25) =$

21) $12 - (-8) - (-18) =$

22) $(15 - 28) - (-22) =$

23) $19 - 44 - (-14) =$

24) $67 - (57 + 19) - (-8) =$

25) $56 - (-12) + (-19) =$

26) $22 - (-44) + (-55) =$

Answers

Adding and Subtracting Integers

1) 7
2) -32
3) -20
4) 31
5) -14
6) 33
7) 16
8) 3
9) 5
10) 37
11) -4
12) 35
13) -36
14) 46
15) 34
16) 53
17) 93
18) 11
19) 26
20) 71
21) 38
22) 9
23) -11
24) -1
25) 49
26) 11

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Multiplying and Dividing Integers

Find each product.

1) $(-7) \times (-8) =$

2) $(-4) \times 5 =$

3) $5 \times (-11) =$

4) $(-5) \times (-20) =$

5) $-(2) \times (-8) \times 3 =$

6) $(12 - 4) \times (-10) =$

7) $14 \times (-10) \times (-5) =$

8) $(18 + 12) \times (-8) =$

9) $9 \times (-15 + 6) \times 3 =$

10) $(-5) \times (-8) \times (-12) =$

Find each quotient.

11) $16 \div (-4) =$

12) $(-25) \div (-5) =$

13) $(-40) \div (-8) =$

14) $64 \div (-8) =$

15) $(-49) \div 7 =$

16) $(-112) \div (-4) =$

17) $168 \div (-12) =$

18) $(-121) \div (-11) =$

19) $216 \div (-12) =$

20) $-(152) \div (8) =$

21) $(-152) \div (-8) =$

22) $-216 \div (-12) =$

23) $(-198) \div (-9) =$

24) $195 \div (-13) =$

25) $-(182) \div (-7) =$

26) $(126) \div (-14) =$

Answers

Multiplying and Dividing Integers

1) 56
2) -20
3) -55
4) 100
5) 48
6) -80
7) 700
8) -240
9) -243
10) -480
11) -4
12) 5
13) 5
14) -8
15) -7
16) 28
17) -14
18) 11
19) -18
20) -19
21) 19
22) 18
23) 22
24) -15
25) 26
26) -9

TDL Math Outcome #2 – Activity 2, Worksheet 1 **Name _____**

You will often be required to solve math problems in the TDL industry. Having a solid understanding of basic math will contribute to your success. Read the problems and solve independently. Then as a class, you will be asked to share your answers and justify them.

1 - As a driver of a refrigerated truck, you are always checking the temperature of the cargo. At the beginning of the day, you notice the interior temperature was 24 degrees F. After making a few deliveries, the temperature had dropped to -3. What was the total change in temperature by the time you recorded the second reading?

A. 12 degrees B. -12 degrees C. 21 degrees D. 27 degrees

2 - Tasha works in the Accounting Dept and is working on the bank account balance. She notices when the month began the balance in the account was $32,292.11. Throughout the month several statements have been paid. The procedure is to report if the balance in that account falls below $12,000.00.

Purchase Order 123 = $12,346.10, Purchase Order 456 = $5,213.95, Purchase Order 789 = $2,463.74. Should Tasha report a problem? If so, how much is the deficit? If not, by how much is the account still ok?

3 - Tonya, a train engineer, is transporting several rail cars to different locations. Her day begins at the Rail Distribution Center, where she first travels 53 miles north to make her initial drop-off. From there, she heads 238 miles west to pick up 15 rail cars and deliver 22. Her final leg of the trip takes her 113 miles south. How many miles farther south is Tonya compared to her starting point?_____ Miles

4 - Bo is the pilot at Distribution Central, normally flying at an altitude of 30,000 feet. On his first delivery route, he descends 1,205 feet, then ascends 143 feet, then descends again 2,170 feet and finally climbs 129 feet. Is Bo currently flying above his usual altitude? If not, how much lower or higher is he?
_____ y/n _____feet

5 - Stuart is starting his day and will leave the distribution center at 8:00am sharp. He will be making several deliveries today. He will drive to his first stop 1 hour and 25 minutes away and wait 30 minutes to be unloaded. Quickly getting back on the road, Luke will drive 45 min to the next location where it will take 55 minutes to unload. Following that stop, Luke will decide to take a 30 minute break to get something to eat. His next stop is 1 hour and 15 minutes away. The delivery dock will be closing early for repairs. If the dock closes at 2:00, should Luke make it before they close? By approximately how much time?
_____y/n _____ minutes

ANSWER KEY

1 - D
(-3 – 24 = -27 answer is 27 degree difference)

2 - No, $268.32
($12,346.10 + $5,213.95 + $2,463.74 = $20,023.79 $32,292.11 - $20,023.79 = $12,268.32)

3 - 60 miles
(113 – 53 = 60) Lots of extra information

4 - No -3,103 ft
(30,000 – 1,205 = 28,795 + 143 = 28,938 – 2,170 = 26,768 + 129 = 26,897

5 - Yes Approx. 40 min
(8:00 am – 1 hr 25 min – arrive 9:25 am
Unload 30 min – 9:55 am
Drive 45 min – arrive 10:40 am
Unload 55 min – finish 11:35 am
30 min break – finish 12:05 pm
Drive 1 hr 15 min – arrive 1:20 pm)

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Adding and Subtracting Mixed Numbers

Find the sum.

1) $2\frac{1}{2}+1\frac{1}{3}=$

2) $6\frac{1}{2}+3\frac{1}{2}=$

3) $2\frac{3}{8}+3\frac{1}{8}=$

4) $4\frac{1}{2}+1\frac{1}{4}=$

5) $1\frac{3}{7}+1\frac{5}{14}=$

6) $6\frac{5}{12}+3\frac{3}{4}=$

7) $5\frac{1}{2}+8\frac{3}{4}=$

8) $3\frac{7}{8}+3\frac{1}{3}=$

9) $3\frac{3}{9}+7\frac{6}{11}=$

10) $7\frac{5}{12}+4\frac{3}{10}=$

Find the difference.

11) $3\frac{1}{3}-1\frac{1}{3}=$

12) $4\frac{1}{2}-3\frac{1}{2}=$

13) $5\frac{1}{2}-2\frac{1}{4}=$

14) $6\frac{1}{6}-5\frac{1}{3}=$

15) $8\frac{1}{2}-1\frac{1}{10}=$

16) $9\frac{1}{2}-2\frac{1}{4}=$

17) $9\frac{1}{5}-5\frac{1}{6}=$

18) $14\frac{3}{10}-13\frac{1}{3}=$

19) $19\frac{2}{3}-11\frac{5}{8}=$

20) $20\frac{3}{4}-14\frac{2}{3}=$

21) $2\frac{1}{2}-1\frac{1}{5}=$

22) $3\frac{1}{6}-1\frac{1}{10}=$

23) $16\frac{2}{7}-11\frac{2}{3}=$

24) $15\frac{1}{7}-10\frac{1}{8}=$

25) $12\frac{3}{4}-7\frac{1}{3}=$

26) $15\frac{2}{5}-5\frac{2}{3}=$

Answers

Adding and Subtracting Mixed Numbers

1) $3\frac{5}{6}$
2) 10
3) $5\frac{1}{2}$
4) $5\frac{3}{4}$
5) $2\frac{11}{14}$
6) $10\frac{1}{6}$
7) $14\frac{1}{4}$
8) $7\frac{5}{24}$
9) $10\frac{29}{33}$
10) $11\frac{43}{60}$
11) 2
12) 1
13) $3\frac{1}{4}$
14) $\frac{5}{6}$
15) $7\frac{2}{5}$
16) $7\frac{1}{4}$
17) $4\frac{1}{30}$
18) $\frac{29}{30}$
19) $8\frac{1}{24}$
20) $6\frac{1}{12}$
21) $\frac{13}{10}$
22) $2\frac{1}{15}$
23) $4\frac{13}{21}$
24) $5\frac{1}{56}$
25) $5\frac{5}{12}$
26) $9\frac{11}{15}$

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Multiplying and Dividing Mixed Numbers

Find the product.

1) $4\frac{1}{3} \times 2\frac{1}{5} =$

2) $3\frac{1}{2} \times 3\frac{1}{4} =$

3) $5\frac{2}{5} \times 2\frac{1}{3} =$

4) $2\frac{1}{2} \times 1\frac{2}{9} =$

5) $3\frac{4}{7} \times 2\frac{3}{5} =$

6) $7\frac{2}{3} \times 2\frac{2}{3} =$

7) $9\frac{8}{9} \times 8\frac{3}{4} =$

8) $2\frac{4}{7} \times 5\frac{2}{9} =$

9) $5\frac{2}{5} \times 2\frac{3}{5} =$

10) $3\frac{5}{7} \times 3\frac{5}{6} =$

Find the quotient.

11) $1\frac{2}{3} \div 3\frac{1}{3} =$

12) $2\frac{1}{4} \div 1\frac{1}{2} =$

13) $10\frac{1}{2} \div 1\frac{2}{3} =$

14) $3\frac{1}{6} \div 4\frac{2}{3} =$

15) $4\frac{1}{8} \div 2\frac{1}{2} =$

16) $2\frac{1}{10} \div 2\frac{3}{5} =$

17) $1\frac{4}{11} \div 1\frac{1}{4} =$

18) $9\frac{1}{2} \div 9\frac{2}{3} =$

19) $8\frac{3}{4} \div 2\frac{2}{5} =$

20) $12\frac{1}{2} \div 9\frac{1}{3} =$

21) $2\frac{1}{8} \div 1\frac{1}{2} =$

22) $1\frac{1}{10} \div 1\frac{3}{5} =$

23) $5\frac{2}{5} \div 1\frac{3}{4} =$

24) $5\frac{1}{2} \div 2\frac{2}{3} =$

25) $3\frac{3}{4} \div 1\frac{1}{5} =$

26) $3\frac{1}{2} \div 1\frac{1}{3} =$

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Answers

Multiplying and Dividing Mixed Numbers

1) $9\frac{8}{15}$
2) $11\frac{3}{8}$
3) $12\frac{3}{5}$
4) $3\frac{1}{18}$
5) $9\frac{2}{7}$
6) $20\frac{4}{9}$
7) $86\frac{19}{36}$
8) $13\frac{3}{7}$
9) $14\frac{1}{25}$
10) $14\frac{5}{21}$
11) $\frac{1}{2}$
12) $1\frac{1}{2}$
13) $6\frac{3}{10}$
14) $\frac{19}{28}$
15) $1\frac{13}{20}$
16) $\frac{21}{26}$
17) $1\frac{1}{11}$
18) $\frac{57}{58}$
19) $3\frac{31}{48}$
20) $1\frac{19}{56}$
21) $1\frac{5}{12}$
22) $\frac{11}{16}$
23) $3\frac{3}{35}$
24) $2\frac{1}{16}$
25) $3\frac{1}{8}$
26) $2\frac{5}{8}$

Working with a tape measure

Look around the room you are in and identify 4 things to measure. Log them below. When recording the measurement, the first measurement should include feet and inches, then total inches.

What is it? _____

How tall is the item? _____ _____ inches

How long (this is the longest side) _____ _____ inches

How wide is the item? _____ _____ inches

What is it? _____

How tall is the item? _____ _____ inches

How long (this is the longest side) _____ _____ inches

How wide is the item? _____ _____ inches

What is it? _____

How tall is the item? _____ _____ inches

How long (this is the longest side) _____ _____ inches

How wide is the item? _____ _____ inches

What is it? _____

How tall is the item? _____ _____ inches

How long (this is the longest side) _____ _____ inches

How wide is the item? _____ _____ inches

TDL Math Outcome #3 – Activity 2, Worksheet 2

Name _____

With a partner, find the answer to the following questions and record your answer.

1 – As a delivery driver, you work the following hours during a week. How many total hours did you work?

Mon 7 ¾ hrs Tues 10 ¼ hr Wed 12 ½ Thur 5 ¼ Fri 9 ½

2 – You are loading a truck to make deliveries to floral shops. The truck is loaded as follows: 1/5 of the truck is daisies, 1/8 of the truck is greens, 2/5 of the truck is roses, and 1/10 of the truck is tulips. Is the truck completely full?

3 – You have found a trail mix you really enjoy. Since you are in the truck so much, you decide to package 2 1/3 cups of mix in bags. Further, you want to prepare 2 weeks (10 days) of mix to save time. The large bag of trail mix says it contains 35 cups of trail mix. Will you have enough for 2 weeks?

4 – You need to cut a board for shelves in the office. Each shelf should be 3 2/3" long and they want 5 shelves. If your board is 15' long, will you have enough? If not, how much are you long or short?

5 – The airplane has lots of cargo to load. If they have enough cargo to fill 7 1/4 planes to maximum capacity, how many planes can this same amount of cargo fill to ¾ capacity?

6 – Now it is your turn to create a problem for the class to solve. You should create a problem using fractions and using addition, subtraction, multiplication, or division steps. Be ready to present your problem on the whiteboard or shared document. Give the class a few minutes to try to solve the problem. Then, you present the answer to the problem with an explanation.

ANSWER KEY

1 – 45 ¼ hr

2 – no 33/40

3 – yes 32 2/3 cups will be needed
2 1/3 = 7/3 x 10 = 70/3 = 23 1/3

4 – no 3 1/3” short

5 – 10 planes (9 2/3)

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Adding and Subtracting Decimals

Add and subtract decimals.

1) $31.13 - 11.45$

2) $35.25 + 24.47$

3) $73.50 + 22.78$

4) $56.67 - 44.39$

5) $71.47 + 16.25$

6) $68.99 - 53.61$

7) $66.24 - 23.11$

8) $39.75 + 12.85$

9) $229.25 - 84.67$

Find the missing number.

10) $\_\_\_ + 2.5 = 3.9$

11) $1.7 + \_\_\_ = 4.98$

12) $5.25 + \_\_\_ = 7$

13) $6.55 - \_\_\_ = 2.45$

14) $\_\_\_ - 3.98 = 5.32$

15) $\_\_\_ - 11.67 = 14.48$

16) $12.35 + \_\_\_ = 14.78$

17) $\_\_\_ - 23.89 = 13.90$

18) $\_\_\_ + 17.28 = 19.56$

19) $77.90 + \_\_\_ = 102.60$

Answers

Adding and Subtracting Decimals

1) 19.68
2) 59.72
3) 96.28
4) 12.28
5) 87.72
6) 15.38
7) 43.13
8) 52.60
9) 144.58
10) 1.4
11) 3.28
12) 1.75
13) 4.1
14) 9.3
15) 26.15
16) 2.43
17) 37.79
18) 2.28
19) 24.7

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Multiplying and Dividing Decimals

Find the product.

1) $0.5 \times 0.4 =$

2) $2.5 \times 0.2 =$

3) $1.25 \times 0.5 =$

4) $0.75 \times 0.2 =$

5) $1.92 \times 0.8 =$

6) $0.55 \times 0.4 =$

7) $3.24 \times 1.2 =$

8) $12.5 \times 4.2 =$

9) $22.6 \times 8.2 =$

10) $17.2 \times 4.5 =$

11) $25.1 \times 12.5 =$

12) $33.2 \times 2.2 =$

Find the quotient.

13) $1.67 \div 100 =$

14) $52.2 \div 1{,}000 =$

15) $4.2 \div 2 =$

16) $8.6 \div 0.5 =$

17) $12.6 \div 0.2 =$

18) $16.5 \div 5 =$

19) $13.25 \div 100 =$

20) $25.6 \div 0.4 =$

21) $28.24 \div 0.1 =$

22) $34.16 \div 0.25 =$

23) $44.28 \div 0.5 =$

24) $38.78 \div 0.02 =$

Answers

1) 0.2
2) 0.5
3) 0.625
4) 0.15
5) 1.536
6) 0.22
7) 3.888
8) 52.5
9) 185.32
10) 77.4
11) 313.75
12) 73.04
13) 0.0167
14) 0.0522
15) 2.1
16) 4.3
17) 63
18) 3.3
19) 0.1325
20) 64
21) 282.4
22) 136.64
23) 88.56
24) 1,939

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Comparing Decimals

Write the correct comparison symbol (>, < or =).

1) 0.50 ☐ 0.050

2) 0.025 ☐ 0.25

3) 2.060 ☐ 2.07

4) 1.75 ☐ 1.07

5) 4.04 ☐ 0.440

6) 3.05 ☐ 3.5

7) 5.05 ☐ 5.050

8) 1.02 ☐ 1.1

9) 2.45 ☐ 2.125

10) 0.932 ☐ 0.0932

11) 3.15 ☐ 3.150

12) 0.718 ☐ 0.89

13) 7.060 ☐ 7.60

14) 3.59 ☐ 3.129

15) 4.33 ☐ 4.319

16) 2.25 ☐ 2.250

17) 1.95 ☐ 1.095

18) 8.051 ☐ 8.50

19) 1.022 ☐ 1.020

20) 3.77 ☐ 3.770

Answers

Comparing Decimals

1) >
2) <
3) <
4) >
5) >
6) <
7) =
8) <
9) >
10) >
11) =
12) <
13) <
14) >
15) >
16) =
17) >
18) <
19) >
20) =

TDL Math Outcome #4 – Activity 2, Worksheet 1

With a partner, students solve and discuss the following problems.

1 - There are 15 rail cars filled with coal going north. The cars are filled to 4/5 capacity. It is determined that the cargo needs to be distributed equally among 24 rail cars. What fraction of coal will each car carry?
(Record your answer in decimal form.)

2 - This load of cargo will pay $1.32 per mile. The trip will be 341 miles. You have determined you have 40 gallons of fuel, and you typically get 8 miles to the gallon. Will you have enough fuel? _____
You must travel at no more than 50 miles per hour due to the load weight. You have just completed another drop today and only have 5 hours of driving time left before you must take a break. Will you be able to deliver this load today? _____ Because the trip pays $1.32 per mile and the trip will be 341, how much will this load pay? _____

3 - Place these numbers in order from least to greatest. (Record all answers in decimal form.)

5^2 2/5 9^2 .26 .98 7/8 7/16 3/4

4 - Taco Tuesday is always a fun time for everyone. You decide to go out with a group of friends for your birthday. There are nine people, and the bill will be split equally. Since the group was so large, a tip was added to the bill. When the bill comes, it is $449.01. You have a $50.00 bill in your pocket. Will you need to run to the ATM? _____ What is your part of the bill? _____

5 – Your candle shop needs to ship 3 boxes. The company you use for shipping charges $0.78 per pound to ship packages. Each of the boxes is a different weight: 12.4 lbs, 15.6 lbs and 10.9 lbs. What is the total cost to ship all 3 boxes? _____

6 – As a driver you are asked to deliver packages to 3 cities: City A is 63.5 miles away, City B is 47.3 miles further, and City C is 54.8 miles from City B. The average speed of 55.5 miles per hour is determined for these deliveries. How many hours will the entire trip take (to the nearest hundredth)?

TDL Math Outcome #4

Answer Key

1 – 4/5 x 15 = 12/24= .50 or ½ full

2 – no 40x8=320

no 341/50=6.82
$1.32 x 341 = $450.12

3 –.26, 2/5 (.4), ¾, 7/8 (.88), .98, 5^2, 9^2

4 – $449.01 / 9 = $49.89 each

Yes the $50.00 bill is enough

5 – 12.4 + 15.6 + 10.9 = 38.9 lbs x $.78 = $30.34

6 – 63.5 + 47.3 + 54.8 = 165.6 miles then divide by 55.5 = 2.98 hours

EffortlessMath

Math Worksheets

Name: _____
Date: _____

Ratio and Rates Word Problems

Solve each word problem.

1) Bob has 12 red cards and 20 green cards. What is the ratio of Bob's red cards to his green cards? _____

2) In a party, 10 soft drinks are required for every 12 guests. If there are 252 guests, how many soft drinks is required? _____

3) In Jack's class, 18 of the students are tall and 10 are short. In Michael's class 54 students are tall and 30 students are short. Which class has a higher ratio of tall to short students? _____

4) The price of 3 apples at the Quick Market is $1.44. The price of 5 of the same apples at Walmart is $2.50. Which place is the better buy? _____

5) The bakers at a Bakery can make 160 bagels in 4 hours. How many bagels can they bake in 16 hours? What is that rate per hour? _____

6) You can buy 5 cans of green beans at a supermarket for $3.40. How much does it cost to buy 35 cans of green beans? _____

7) The ratio of boys to girls in a class is 2:3. If there are 18 boys in the class, how many girls are in that class? _____

8) The ratio of red marbles to blue marbles in a bag is 3:4. If there are 42 marbles in the bag, how many of the marbles are red? _____

Answers

Ratio and Rates Word Problems

1) 3: 5
2) 210
3) The ratio for both classes is 9 to 5.
4) Quick Market is a better buy.
5) 640, the rate is 40 per hour.
6) $23.80
7) 27
8) 18

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Probability Problems

Solve.

1) A number is chosen at random from 1 to 10. Find the probability of selecting number 4 or smaller numbers. _____

2) Bag A contains 9 red marbles and 3 green marbles. Bag B contains 9 black marbles and 6 orange marbles. What is the probability of selecting a green marble at random from bag A? What is the probability of selecting a black marble at random from Bag B? _____ _____

3) A number is chosen at random from 1 to 50. What is the probability of selecting multiples of 10. _____

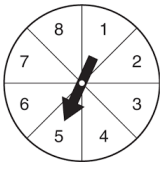
4) A card is chosen from a well-shuffled deck of 52 cards. What is the probability that the card will be a king OR a queen? _____

5) A number is chosen at random from 1 to 10. What is the probability of selecting a multiple of 3. _____

A spinner, numbered 1-8, is spun once. What is the probability of spinning …

6) an EVEN number? _____ 7) a multiple of 3? _____

8) a PRIME number? _____ 9) number 9? _____



Answers

Probability Problems

1) $\frac{2}{5}$

2) $\frac{1}{4}, \frac{3}{5}$

3) $\frac{1}{5}$

4) $\frac{2}{13}$

5) $\frac{3}{10}$

6) $\frac{1}{2}$

7) $\frac{1}{4}$

8) $\frac{1}{2}$

9) 0

TDL Math Outcome #5 - Actiivty 2, Step 1, Worksheet 1

What Is a Ratio? Definition and Examples

There are several ways to express a ratio. One of the most common is to write a ratio using a colon as a this-to-that comparison. For example, if your team has a two to one chance of winning, you could present that as 2:1. Because ratios are simple division problems, you can also write them as fractions. Some people prefer to express ratios using only words, as in, "My class has 13 girls to 10 boys."

In the context of mathematics, the colon and fraction format are preferred. When comparing more than two quantities, opt for the colon format. For example, if you are preparing a mixture that calls for 1 part oil, 1 part vinegar, and 10 parts water, you could express the ratio of oil to vinegar to water as 1:1:10. Consider the context of the comparison when deciding how best to write your ratio.

Simplifying Ratios

No matter how you write a ratio, it is important that you simplify it to the smallest whole numbers possible, as with any fraction. You can do this by finding the greatest common factor between the numbers and dividing them accordingly. With a ratio comparing 12 to 16, for example, you see that you can divide 12 and 16 by 4. This simplifies your ratio into 3 to 4 or the quotients you get when you divide 12 and 16 by 4. You can now write your ratio as:

- 3:4
- $\frac{3}{4}$
- 3 to 4
- 0.75 (a decimal is sometimes permissible, though less commonly used)

Practice Calculating Ratios with Two Quantities

Practice identifying real-life opportunities for expressing ratios. Find quantities you want to compare, calculate those ratios, and simplify them to their smallest whole numbers. Below are a few examples of authentic ratios to practice calculating.

1. There are six apples in a bowl containing eight pieces of fruit. What is the ratio of apples to the total amount of fruit? _____

2. If the two pieces of fruit that are not apples are oranges, what is the ratio of apples to oranges? _____

3. Dr. Pasture, a rural veterinarian, treats only two types of animals—cows and horses. Last week, she treated 12 cows and 16 horses. What is the ratio of cows to horses she treated? _____

4. What is the ratio of cows to the total number of animals she treated? _____

Practice Calculating Ratios with Greater Than Two Quantities
Use the following demographic information about a marching band to complete the following exercises using ratios comparing two or more quantities.

Gender
- 120 boys
- 180 girls

Instrument type
- 160 woodwinds
- 84 percussion
- 56 brass

Class
- 127 freshmen
- 63 sophomores
- 55 juniors
- 55 seniors

1. What is the ratio of boys to girls? _____

2. What is the ratio of freshmen to the total number of band members? _____

3. What is the ratio of percussion to woodwinds to brass? _____

4. What is the ratio of freshmen to seniors to sophomores? _____

5. If 25 students left the woodwind section to join the percussion section, what would be the ratio for the number of woodwind players to percussion? _____

Adapted from the site: What Is a Ratio? Definition and Examples
https://www.thoughtco.com/what-is-ratio-definition-examples-2312529

Practice Calculating Ratios with Two Quantities

1 - 6:8, simplified to 3:4

2 - 6:2, simplified to 3:1

3 - 12:16, simplified to 3:4. For every three cows treated, four horses were treated

4 - 12 + 16 = 28, the total number of animals treated. The ratio for cows to total is 12:28, simplified to 3:7. For every seven animals treated, three of them were cows

Practice Calculating Ratios with Greater Than Two Quantities

1 - 2:3

2 - 127:300

3 - 84:160:56, simplified to 21:40:14

4 - 127:55:63. Note: 127 is a prime number and cannot be reduced in this ratio

5 - 160 woodwinds – 25 woodwinds = 135 woodwinds;
84 percussionists + 25 percussionists = 109 percussionists.
The ratio of the number of players in woodwinds to percussion is 109:135

TDL Math Outcome #6 – Activity 2, Worksheet 1 **Name _____**

How to Calculate Average: Formulas, Real-World Examples & Tools

The average, or arithmetic mean, is a cornerstone of data analysis. Whether you're a student calculating your semester grades, a retailer tracking inventory, or a scientist analyzing lab results, understanding how to calculate average is essential. Let's break down the process with real-world examples and practical tools.

The Basic Formula for Calculating Average

The universal formula for finding an average is:

$$\text{Average} = \frac{\text{Sum of Values}}{\text{Number of Values}}$$

Example: Sarah's test scores in Math are 85, 90, and 80. To find her average:

1. Sum: 85+90+80=25585+90+80=255
2. Number of Tests: 3
3. Average: 2553=853255=85

This 85 average helps Sarah gauge her overall performance.

How to Calculate Average Percentage

Averages aren't limited to whole numbers. Let's say a teacher wants to find the average percentage scored by a class of 5 students on a biology exam:

Student	Score (%)
Alex	75
Priya	80
Jordan	85
Mia	90
Liam	95

1. Sum of Percentages: 75+80+85+90+95=42575+80+85+90+95=425
2. Number of Students: 5
3. Average Percentage: 425/5=85%

This 85% class average helps the teacher assess overall comprehension.

Adapted from "How To Calculate Average: Formulas, Real-World Examples & Tools - Measure Tutor"
https://measuretutor.com/how-to-calculate-average/

TDL Math Outcome #6 – Activity 3, Worksheet 1 **Name _____**

Understanding how numbers change and relate to one another is incredibly useful in the TDL industry. The following problems will introduce real-world scenarios you may encounter in the field and give you a chance to apply these skills.

1 - Karl enjoys driving and has taken a new position in the TDL industry. This time of year is very busy, so Karl has been putting in a lot of hours. He has worked 24 out of 30 days this month. What percent of the days in the month has Karl worked?

A. 80% B. 75% C. 85% D. 90%

2 – Mark needs to make sure the cows have plenty of water. He has a busy morning ahead. When he checks the tank, it is $\frac{2}{5}$ full. What percentage of the tank is full?

A. 30% B. 35% C. 40% D. 25%

3 – Stacy has started her new business. She is excited to check her daily sales this week. Monday $4,239, Tuesday $2,893, Wednesday $3,998, Thursday 4,611 and Friday 3,502. She needs to know the mean/average of her sales this week.
How will she find it and what will it be?_____

4 – As the Manager, it is your job to keep track of how many trucks pass through the loading dock per week. You need to know the range of trucks that have been moved this week. Mon - 22, Tues - 30, Wed - 52, Thurs - 43 and Fri - 38. _____trucks

5 - Stuart needs new tires for his truck. He will be purchasing 2 tires for the front at $74.95 each, and they will need to be balanced, which is $15.95 each. However, the other 8 tires are a different type and will cost $64.95 each. Stuart is starting to save for his tires. He knows he will need a 20% down payment to order the tires.

How much does he need to save in order to place the tire order? _____

Of the balance remaining after the down payment, Stuart will be saving $85.00 a month. Will he have the balance saved in 5 months? _____

Answer Key

1 – A. 80%
2 – C 40%
3 – Add them up and divide by 5 $3,848.60 4 – 30 trucks
5 - $133.90 No, he will not

TDL Math Outcome #6 – Activity 3, Worksheet 2 **Name _____**

**** Survey ****

1 – What is your favorite fruit? _____

2 – What is your favorite season? _____

3 – What is your favorite number? (between 1 & 5) _____

4 – Do you have a pet? _____

5 – What is your favorite holiday? _____

6 – What is your favorite cookie? _____

7 – What is your least favorite dish? _____

8 – Have you ever been on a train? _____

9 – What is your favorite month? _____

10 – How many miles do you drive to class? _____

Using the information from the questions above—and applying your understanding of percentages, averages, estimation, mean, median, mode, and range—identify four different ways the data can be analyzed or used.

1 –

2 –

3 –

4 –

EffortlessMath

Math Worksheets

Name: _____

Date: _____

Discount, Tax and Tip

Find the selling price of each item.

1) Original price of a computer: $500
   Tax: 6% Selling price: $_____
2) Original price of a laptop: $350
   Tax: 8% Selling price: $_____
3) Original price of a sofa: $800
   Tax: 7% Selling price: $_____
4) Original price of a car: $18,500
   Tax: 8.5% Selling price: $_____
5) Original price of a Table: $250
   Tax: 5% Selling price: $_____
6) Original price of a house: $250,000
   Tax: 6.5% Selling price: $_____
7) Original price of a tablet: $400
   Discount: 20% Selling price: $_____
8) Original price of a chair: $150
   Discount: 15% Selling price: $_____
9) Original price of a book: $50
   Discount: 25% Selling price: $_____
10) Original price of a cellphone: $500
   Discount: 10% Selling price: $_____
11) Food bill: $24
   Tip: 20% Price: $_____
12) Food bill: $60
   Tipp: 15% Price: $_____
13) Food bill: $32
   Tip: 20% Price: $_____
14) Food bill: $18
   Tipp: 25% Price: $_____

Solve each word problem.

15) Nicolas hired a moving company. The company charged $400 for its services, and Nicolas gives the movers a 15% tip. How much does Nicolas tip the movers? $_____

16) Mason has lunch at a restaurant and the cost of his meal is $30. Mason wants to leave a 20% tip. What is Mason's total bill including tip? $_____

17) The sales tax in Texas is 8.25% and an item costs $400. How much is the tax? $_____

18) The price of a table at Best Buy is $220. If the sales tax is 6%, what is the final price of the table including tax? $_____

Answers

Discount, Tax and Tip

1) $530.00
2) $378.00
3) $856.00
4) $20,072.50
5) $262.50
6) $266,250
7) $320.00
8) $127.50
9) $37.50
10) $450.00
11) $28.80
12) $69.00
13) $38.40
14) $22.50
15) $60.00
16) $36.00
17) $33.00
18) $233.20

TDL Math Outcome #7 – Activity 2, Worksheet 1 **Name _____**

Special Seeds, Inc.

You've just been hired as the new Inventory Clerk at a garden supply store. As you review the seed inventory, you notice that some seed packets aren't selling well and may need to be discounted to clear them out before they get too close to their expiration date. On the other hand, some popular items are selling quickly and may be ready for a slight price increase.

1 - The original prices are given below. Your task is to recommend pricing changes by calculating the percentage decrease for slower-selling items and the percentage increase for bestsellers. Be sure to show your calculations and be prepared to explain your suggestions to the Manager.

Item	Original Price	% changed	Amount changed	New Price
Daisy	$3.75			
Sunflower	$5.99			
Marigold	$4.25			
Zinnia	$6.50			
Cosmos	$4.80			
Petunia	$3.25			
Lavender	$5.99			
Snapdragon	$7.30			
Pansy	$3.95			
Alyssum	$4.75			
Morning Glory	$5.75			
Coneflower	$3.90			
Black-eyed Susan	$6.99			

2 - To remain competitive and support company growth, businesses often focus on reducing operating costs. With rising fuel prices, transportation expenses have become a major concern. Currently, the company trucks cost $0.65 per mile to operate due to fuel costs. However, a new line of trucks is expected to reduce fuel expenses by 18% per mile. What is the operating cost per mile for the new trucks after the 18% savings?

3 – Thanks to a successful year, the company has decided to award employees a 7% salary increase. When you were first hired, your annual salary was $35,750. What will your new salary be after the 7% increase?

4 – You have just been notified your vegetable seeds order will not be received in full. You originally placed an order for 300 packages of lettuce, but due to a mix-up, 12% of the order will be delayed. How many packages of lettuce will be delayed?

ANSWER KEY

1 – the chart will vary

2 – $0.53 per mile savings

3 - $38,252.50

4 – 36 pkgs

Distance, Rate, and Time Word Problems

1) A train left for Miami, and 9 hours later, a car traveling 44 mph tried catching up to the train. After 7 hours, the car caught up. What was the train's average speed? _____

2) Keith left Portland traveling 57 mph. Sandy, to catch up, left some time later driving at 66 mph. Sandy caught up after 3 hours. How long was Keith driving before Sandy caught up? _____

3) Sara left the city traveling at 51 mph, while, at the same time, Jason left the city going the opposite direction at a speed of 46 mph. Find the time Sara traveled before the two were 93 miles apart. _____

4) Melanie traveled to Greensboro by car. Going there took 4 hours, and the return trip lasted 3 hours. Melanie averaged a speed of 55 mph while returning. Find the average speed of the trip there. _____

5) A plane set off to Greensboro at a speed of 234 mph. On the return flight of 11 hours, the plane cruised at 210 mph. How many hours long was the flight to Greensboro? _____

6) A truck and van left from Tampa in opposite directions. The truck traveled for 9 hours at 89 mph. The vehicles were 1082 miles apart. Find the van's average speed. _____

7) Dan left NYC with a speed of 61 mph. Nancy also left at the same time in the opposite direction at a speed of 62 mph. Find how many hours Nancy must travel before they are 256 miles apart. _____

8) Sandy left downtown Paris, and three hours later, Tom left going 75 mph faster to catch up. After another two hours, Tom caught up. Find Sandy's average speed. _____

9) Tom left the city for vacation. Sandy left 8 hours later going 82 mph faster to catch up. After 7 hours Sandy caught up. What was Tom's average speed? _____

10) A cargo plane flew from the US across the Atlantic at 210 mph, and flew back to the US at 230 mph. Given that the first trip took two hours longer, how long was the return trip? _____

Name : _____ Score : _____

Teacher : _____ Date : _____

Distance, Rate, and Time Word Problems

1) A train left for Miami, and 9 hours later, a car traveling 44 mph tried catching up to the train. After 7 hours, the car caught up. What was the train's average speed?

19.25 mph

2) Keith left Portland traveling 57 mph. Sandy, to catch up, left some time later driving at 66 mph. Sandy caught up after 3 hours. How long was Keith driving before Sandy caught up?

3.47 hours

3) Sara left the city traveling at 51 mph, while, at the same time, Jason left the city going the opposite direction at a speed of 46 mph. Find the time Sara traveled before the two were 93 miles apart.

0.96 hours

4) Melanie traveled to Greensboro by car. Going there took 4 hours, and the return trip lasted 3 hours. Melanie averaged a speed of 55 mph while returning. Find the average speed of the trip there.

41.25 mph

5) A plane set off to Greensboro at a speed of 234 mph. On the return flight of 11 hours, the plane cruised at 210 mph. How many hours long was the flight to Greensboro?

9.87 hours

6) A truck and van left from Tampa in opposite directions. The truck traveled for 9 hours at 89 mph. The vehicles were 1082 miles apart. Find the van's average speed.

31.22 mph

7) Dan left NYC with a speed of 61 mph. Nancy also left at the same time in the opposite direction at a speed of 62 mph. Find how many hours Nancy must travel before they are 256 miles apart.

2.08 hours

8) Sandy left downtown Paris, and three hours later, Tom left going 75 mph faster to catch up. After another two hours, Tom caught up. Find Sandy's average speed.

50.00 mph

9) Tom left the city for vacation. Sandy left 8 hours later going 82 mph faster to catch up. After 7 hours Sandy caught up. What was Tom's average speed?

38.27 mph

10) A cargo plane flew from the US across the Atlantic at 210 mph, and flew back to the US at 230 mph. Given that the first trip took two hours longer, how long was the return trip?

21.00 hours

EffortlessMath

Math Worksheets

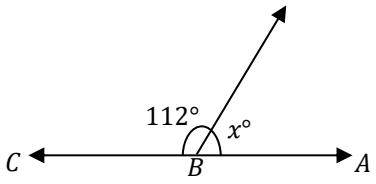
Name: _____

Date: _____

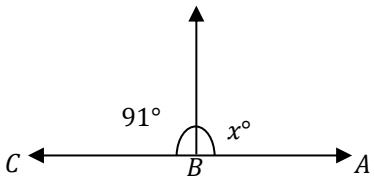
Angles

What is the value of x in the following figures?

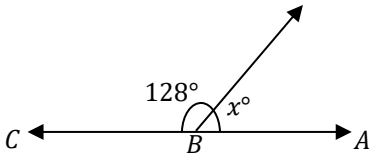
1)



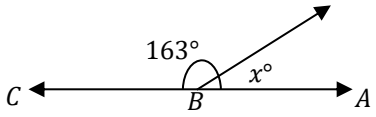
2)



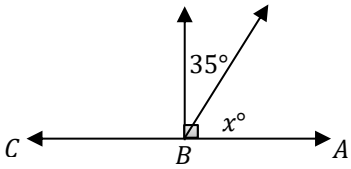
3)



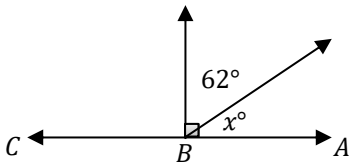
4)



5)



6)



Solve.

7) Two complementary angles have equal measures. What is the measure of each angle?

_____

8) The measure of an angle is two third the measure of its supplement. What is the measure of the angle? _____

9) Two angles are complementary and the measure of one angle is 24 less than the other. What is the measure of the bigger angle? _____

10) Two angles are complementary. The measure of one angle is half the measure of the other. What is the measure of the smaller angle? _____

11) Two supplementary angles are given. The measure of one angle is 50° less than the measure of the other. What does the bigger angle measure? _____

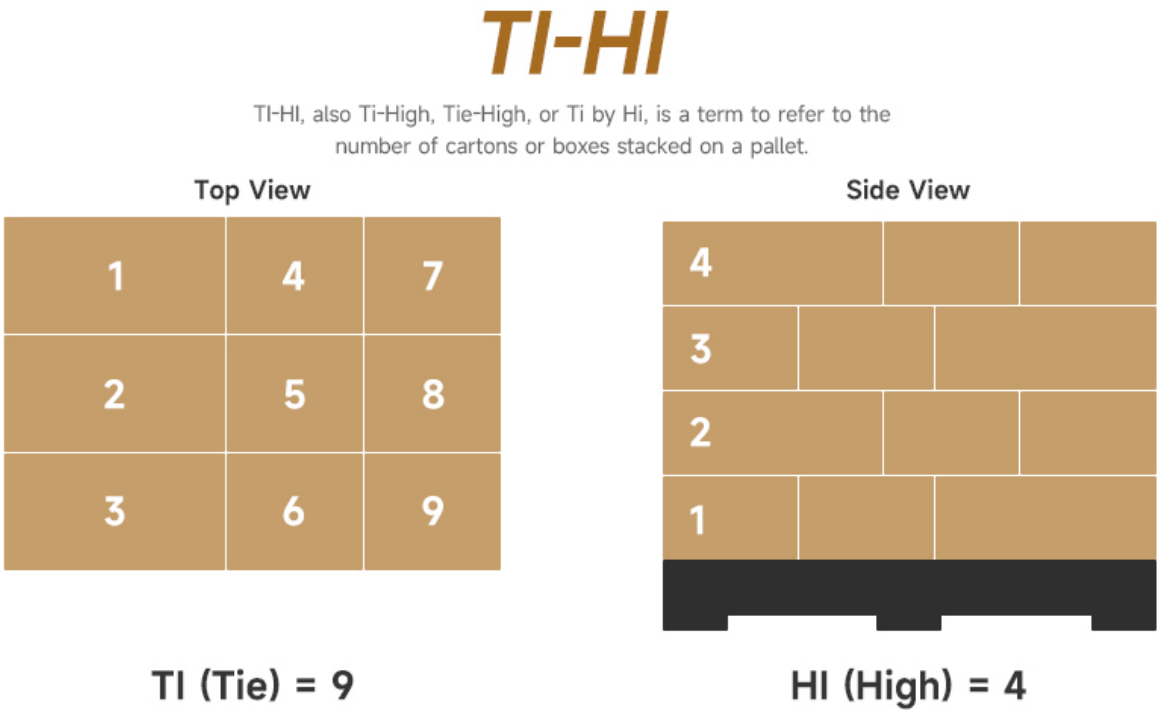
Answers

Angles

1) 68°
2) 89°
3) 52°
4) 17°
5) 55°
6) 28°
7) 45°
8) 72°
9) 57°
10) 30°
11) 115°

TDL Math Outcome #8 – Activity 2

TI-HI, also Ti-High, Tie-High, or Ti by Hi, is a term used to refer to the number of cartons or boxes stacked on a pallet.



TI-HI is a term used in logistics and warehousing to refer to the number of cartons or boxes that are stacked on top of each other on a pallet. TI stands for "tier," which refers to the number of cartons in each layer, while HI stands for "height," which refers to the number of layers on the pallet. For example, a TI-HI of 5-4 means that there are five cartons in each layer and four layers on the pallet, for a total of 20 cartons. The TI-HI ratio is an important consideration in logistics and warehousing, as it can affect the stability and safety of the pallet during transport and storage.

Adapted from this site: "TI-HI - What is TI-HI, also Ti-High, Tie-High, or Ti by Hi?"
https://www.seabaycargo.com/glossary/TI-HI-also-Ti-High-Tie-High-or-Ti-by-Hi_1220.html

TDL Math Outcome #8 – Activity 3 **Name _____**

Transportation Central

Transportation Central is in the process of expanding its warehouse. With this growth comes a variety of questions to answer and challenges to solve.

The lot located north of the main building must be designed for easy access with large pieces of equipment. It should also provide adequate space for workers and allow for the quick and efficient loading and unloading of materials. Since the area already has concrete, the construction of this expansion should go quickly. However, much thought must go into the design considering that it does rain a lot from time to time, and trees need to be included, as well as space for various supplies to be stored.

The lot is 100’ on two sides, and 75’ on the other two sides. For security reasons, a large fence will need to be placed around this area.

Step 1 - Do an internet search for fencing. Your group will need to calculate the perimeter of the lot and search for a style of fence you think will work best and how much that fence will cost.

Step 2 – The group should create a sketch of the basic layout of the lot. It should include:

- Where large equipment will enter and exit
- Loading/unloading zones
- Walkways for worker safety
- Any additional safety or efficiency features
- Parking for large trucks waiting to load/unload
- Any additional features your group decides it should have

Step 3 – Each group will present their layout of the facility in a slide deck or Power Point presentation. They should be ready to answer questions relating to why they chose this layout and any special features they have included in their design.

TDL Math Outcome #8
How to Figure Out Travel Time: Use a Calculator for Accurate Driving Distance

To figure out travel time, divide the total distance by your speed. For example, if the distance is 300 miles and your speed is 60 mph, the travel time is 5 hours. This formula is useful for estimating travel time and helps with travel planning.

Consider factors that may affect your journey. For example, weather conditions and road construction can influence driving speed. If you are planning a road trip, check both the distance and estimated travel time thoroughly. Ensure you account for breaks and potential stops along the route. These can significantly affect your overall travel time.

Once you understand how to calculate travel time using a distance calculator, you can plan your trip more effectively. Knowing the expected travel time helps in scheduling your departure. Moreover, being aware of the distance allows you to prepare adequately, whether that means fueling up your vehicle or planning meal breaks. With these strategies, you will be better equipped to embark on your journey confidently. Next, we will explore additional tips for optimizing your travel experience and minimizing delays.

What is Travel Time and Why is it Important for My Journey?

Travel time is the duration required to travel from one point to another, often measured in hours or minutes. This measurement is crucial for planning journeys, whether for commuting, travel bookings, or logistics management.

The Transportation Research Board defines travel time as “the time period that elapses between leaving one location and arriving at another.” This definition emphasizes the importance of understanding time allocations for different journeys.

Travel time encompasses various factors such as distance, mode of transportation, traffic conditions, and road types. Each aspect influences the overall duration and efficiency of a journey.
The Federal Highway Administration further explains that travel time can be impacted by infrastructure, weather conditions, and driver behavior. These elements add complexity to travel time estimation.

Several factors contribute to travel time variability. These include traffic congestion, road construction, accidents, and seasonal weather patterns. Each can significantly alter expected travel durations.

According to the Texas A&M Transportation Institute, traffic delays cost the U.S. economy over $87 billion annually, with averages of 54 hours of delay per commuter each year. This trend may worsen with projected population growth.

Excessive travel time affects productivity, increases fuel consumption, and leads to higher stress levels among commuters. It has far-reaching consequences for both individual and societal well-being.

Broader impacts include environmental concerns due to increased emissions from idling vehicles and decreased land use efficiency as infrastructure expands. Economically, high travel time can lead to increased costs for businesses and consumers.

For instance, in urban areas, lengthy commutes often lead to decreased quality of life and reduced participation in community activities. This situation frequently escalates economic disparities.
To mitigate travel time issues, experts recommend the implementation of intelligent transportation systems, carpooling initiatives, and improved public transit options. These measures can enhance efficiency.

Strategies such as real-time traffic monitoring, optimal route planning applications, and telecommuting options can also help manage travel time effectively. Each of these practices aims to reduce congestion and enhance travel efficiency.

How Do Travel Time Calculators Work to Estimate Arrival Times?

Travel time calculators estimate arrival times by analyzing distance, speed, and real-time conditions like traffic. They utilize algorithms to compute these variables, providing users with an estimated time of arrival (ETA).

Distance measurement: Calculators measure the distance between the starting point and the destination. They often use mapping data from sources such as Google Maps or OpenStreetMap to determine the most efficient route.

Speed assumptions: Calculators assume an average speed based on common driving speeds for different types of roads. For example, highways may have a higher average speed compared to city streets.

Traffic data: Many travel time calculators incorporate real-time traffic information. This data can include traffic jams, accidents, and road construction, which can significantly impact travel times.

Route optimization: Algorithms within the calculators analyze various routes. They consider factors such as current traffic conditions, expected delays, and alternative paths to suggest the fastest option.

User input: Users provide starting locations, destinations, and preferred travel modes (e.g., driving, biking, walking). This input allows the calculator to refine its estimates.

Updates and accuracy: Most calculators continuously update their estimates. They adjust arrival times based on changing conditions like new traffic incidents or speed limit modifications.

By combining these elements, travel time calculators offer users a practical means to gauge arrival times, enhancing trip planning and efficiency.

Which Factors Influence the Accuracy of Travel Time Calculators?
Factors that influence the accuracy of travel time calculators include several key elements.
1. Real-time traffic conditions
2. Route selection
3. Weather conditions
4. Road construction and closures
5. Vehicle speed and type
6. User input errors

Real-time traffic conditions: Real-time traffic conditions play a crucial role in determining travel time. These conditions can include slow-moving traffic, accidents, and roadblocks. Traffic data is often collected through GPS devices and mapping services. A study by the Cambridge Systematics in 2019 indicated that traffic congestion can increase travel times by up to 50% during peak hours.

Route selection: Route selection influences travel time accuracy greatly. Route optimization algorithms determine the best paths based on distance and travel speed. A shorter distance does not always equate to a shorter travel time, especially in areas with heavy traffic. For instance, Google Maps may suggest a longer highway route over a shorter side road due to anticipated traffic patterns.

Weather conditions: Weather conditions such as rain, snow, or fog can significantly impact travel speeds. Adverse weather conditions may lead to slower speeds or detours, which affects overall travel time projections. According to the AAA Foundation for Traffic Safety, inclement weather contributes to over 1.2 million car accidents annually, affecting travel estimates.

Road construction and closures: Road construction and closures can also delay travel times. Travel time calculators often rely on updated database information to reflect these changes. If a calculator does not account for ongoing road work, the estimated time may be inaccurate. The U.S. Department of Transportation reports that construction zones can increase average travel time by 30% during peak periods.

Vehicle speed and type: Vehicle type influences speed, especially when comparing cars to trucks or buses. Larger vehicles often have speed limits that differ from smaller ones. For example, a study published by the National Highway Traffic Safety Administration in 2021 noted that heavy trucks generally travel slower than passenger vehicles on highways. This difference affects travel time calculations based on assumed vehicle performance.

User input errors: User input errors can introduce inaccuracies in travel time calculations. Incorrectly entered start and end locations, or miscalculating the journey length, lead to unreliable estimates. A survey by the Pew Research Center in 2020 found that common GPS errors stem from user mistakes, underlining the importance of accurate entry.

In summary, travel time calculators rely on a blend of real-time data, user input, and analytical algorithms, which can produce varying levels of accuracy based on the factors mentioned. Understanding these influencing elements is crucial for obtaining more reliable travel estimates.

Why Should I Trust Online Travel Time Calculators?

You should trust online travel time calculators as they provide estimates based on real-time data and algorithms. These tools analyze various factors like distance, traffic conditions, and driving speeds to give you a reliable estimate of travel duration.

According to the American Automobile Association (AAA), travel time calculations are informed by data on road conditions, traffic patterns, and speed limits. They emphasize the importance of these estimates for planning trips effectively.

The reliability of online travel time calculators stems from several key factors. First, they leverage GPS data, which tracks real-time traffic conditions. Second, they apply algorithms that consider historical data, enabling them to predict how long a journey may take. Finally, many services continuously update their information to reflect changing road conditions, accidents, or construction.
When using these calculators, you may encounter technical terms such as “real-time data”, which refers to information instantaneously updated to show the current state of traffic, and “algorithm”, a set of rules or calculations used to predict outcomes based on input data.

The mechanisms involved in travel time calculation include data collection from various sources, such as GPS signals and traffic cameras. This data is then processed to assess current driving conditions. Factors like traffic congestion influence the estimates. For example, a busy highway during peak hours may yield a longer travel time compared to the same route during off-peak hours.
Specific conditions that affect travel times include weather conditions, road construction, and peak travel times. For instance, bad weather like heavy rain can slow down traffic and increase travel time. Similarly, if you are driving during rush hour, the time taken will likely be longer due to higher vehicle density on the roads.

What Steps Should I Follow to Effectively Use a Travel Time Calculator?
To effectively use a travel time calculator, follow specific steps that ensure accuracy and efficiency in estimating your travel time.

1. Determine your starting point and destination.
2. Choose the route type (fastest, shortest, etc.).
3. Input your mode of transportation (car, bike, walk, etc.).
4. Consider traffic conditions and peak hours.
5. Adjust for rest breaks and potential delays.
6. Review additional features (elevation changes, tolls, etc.).
7. Validate the estimated time with personal experience or other sources.

Understanding these steps will help you obtain a reliable travel estimate tailored to your needs.

1. Determine Your Starting Point and Destination:
   Determining your starting point and destination is the first step in using a travel time calculator. Accurate input of these locations ensures the calculation reflects the right journey. For example, entering “New York City” as a starting point and “Los Angeles” as a destination provides a direct comparison for various routes.
2. Choose the Route Type:
   Choosing the route type allows you to customize your travel preferences. Options can include the fastest route, the shortest distance, or a scenic drive. Selecting the correct option is crucial for aligning travel with your priorities, such as saving time or enjoying the scenery.
3. Input Your Mode of Transportation:
   Inputting your mode of transportation adds relevancy to the travel estimate. Calculators may vary in results based on whether you select a car, public transport, biking, or walking. The estimated travel times differ significantly; for example, a car may take 5 hours, while biking could take over 15 hours for the same journey.
4. Consider Traffic Conditions and Peak Hours:
   Considering traffic conditions and peak hours provides a more accurate estimate. Travel calculators often factor in real-time data, indicating when roads may be congested. For instance, driving through Los Angeles during rush hour can add considerable time to your trip, often doubling the originally calculated travel time.
5. Adjust for Rest Breaks and Potential Delays:
   Adjusting for rest breaks and potential delays ensures a realistic travel time. If you’re planning a long trip, incorporating stops for meals or fuel can impact your schedule. For instance, a 12-hour drive may require several planned breaks, adding an additional 2-3 hours to your overall travel time.
6. Review Additional Features:
   Reviewing additional features enhances the travel estimation. Some calculators offer capacity to consider aspects such as elevation changes, tolls, or road construction. These factors can affect travel speed and route choice; thus, they should be assessed for a well-rounded estimate.
7. Validate the Estimated Time:
   Validating the estimated time with personal experience or other trusted sources ensures accuracy. Travelers may find discrepancies in various calculators, so comparing results or utilizing local knowledge can enhance trust in your planning. For example, locals may have insights on road conditions that calculators may not account for.

   By following these steps, you can effectively utilize a travel time calculator to ensure a smooth journey and accurate estimations.

   What Common Errors Should I Avoid When Estimating Travel Time?
   To estimate travel time accurately, avoid common errors that can lead to significant discrepancies. Here are the main points to consider when estimating travel time:

1. Ignoring Traffic Patterns
2. Overlooking Weather Conditions
3. Not Accounting for Stops and Breaks
4. Underestimating Route Changes
5. Failing to Use GPS or Navigation Tools

Considering these points is essential for an accurate travel time estimate. Understanding the nuances of each can help you avoid pitfalls.

1. Ignoring Traffic Patterns:
   Ignoring traffic patterns leads to significant underestimations of travel time. Rush hour, accidents, and roadwork can all cause delays. According to the Texas A&M Transportation Institute's 2021 Urban Mobility Report, congestion can increase commute times by an average of 45%. Therefore, it's crucial to check traffic data before you start your journey, as tools like Google Maps can provide real-time traffic updates.
2. Overlooking Weather Conditions:
   Overlooking weather conditions affects travel time. Weather events such as rain, snow, or fog can slow down driving speeds and create hazardous conditions. The National Weather Service reports that inclement weather causes over 1.2 million crashes annually in the U.S. Thus, checking the weather forecast beforehand allows for better planning and adjustments to travel time.
3. Not Accounting for Stops and Breaks:
   Not accounting for stops and breaks can distort time estimates. Long trips often require rest stops or meal breaks. The American Automobile Association (AAA) suggests planning for a 15-minute break every two hours of driving. This consideration is vital for longer journeys to avoid fatigue and maintain safety.
4. Underestimating Route Changes:
   Underestimating route changes can lead to incorrect travel time assessments. Accidents or detours necessitate alternative routes that may be longer. A study by INRIX, a transportation analytics company, notes that unexpected detours can add up to 40% more time to your planned route. Therefore, flexibility in your travel plan aids in realistic time estimation.
5. Failing to Use GPS or Navigation Tools:
   Failing to use GPS or navigation tools results in missing critical updates. Modern applications provide live traffic conditions, route optimization, and estimated arrival times tailored to current situations. Research by the University of California shows that using GPS deters common delays by providing alternative routes during congestion. Using these tools can ensure that you stay informed and adjust your travel time as needed.

   How Do Traffic Conditions Impact My Travel Time Estimates?
   Traffic conditions significantly impact travel time estimates by altering driving speeds, increasing the duration of stops, and creating additional delays due to accidents or roadwork. Understanding these factors can help travelers plan more effectively.
6. Driving speeds: Traffic congestion leads to reduced speeds. According to the Texas A&M Transportation Institute (2022), traffic in urban areas can slow down travel by 25% during peak hours. This results in longer journey times compared to non-congested periods.
7. Duration of stops: Stop-and-go traffic increases the amount of time spent at traffic signals. A study by INRIX (2021) indicated that drivers spent an average of 54 hours per year in congestion. Frequent stops can significantly add to overall travel time.
8. Accidents or roadwork: Incidents such as accidents and construction can cause sudden delays. The Federal Highway Administration (2020) reported that accidents contribute to about 25% of traffic delays. This can lead to longer detour routes, increasing travel times unexpectedly.
9. Weather conditions: Adverse weather can exacerbate traffic conditions. The AAA Foundation for Traffic Safety (2021) noted that weather-related factors cause approximately 21% of crashes, which can lead to unexpected delays and increased travel times.
10. By considering these factors, travelers can better estimate their travel times and plan accordingly to avoid unnecessary delays.

In What Ways Does Route Selection Affect Travel Time Accuracy?

Route selection directly affects travel time accuracy in several ways. Choosing different routes can lead to varying distances and travel conditions. Shorter routes may save time but can include unexpected traffic or roadwork. Longer routes may have more predictable traffic patterns. The type of road, such as highways versus local roads, also influences travel speed.

Traffic conditions are a significant component. Routes that avoid congestion typically provide more accurate travel time predictions. Real-time data from navigation apps can help optimize route selection. Weather factors can also alter travel times significantly.

In summary, accurate travel time depends on the chosen route, traffic conditions, road types, and weather factors. Each element contributes to the overall prediction and can lead to either overestimating or underestimating the time required for travel.

How Can I Prepare for Unexpected Changes in Travel Time?

To prepare for unexpected changes in travel time, adopt strategies such as allowing extra time for travel, staying informed about traffic conditions, using navigation apps, and being flexible with travel plans. Allowing extra time for travel: Arriving early can mitigate the effects of delays. For instance, the AAA (American Automobile Association) recommends allowing at least 30 extra minutes for unforeseen circumstances like detours or accidents.

Staying informed about traffic conditions: Regularly check traffic reports before and during travel. According to INRIX, a traffic data provider, 20% of drivers do not use live traffic information, which can delay their arrival times significantly. Staying informed allows travelers to adjust routes proactively.

Using navigation apps: Applications like Google Maps and Waze provide real-time updates on traffic and road conditions. A study from Statista in 2022 indicated that over 70% of drivers utilize these apps for navigation, helping them avoid slowdowns and find quicker routes.

Being flexible with travel plans: Flexibility can alleviate stress related to schedule changes. Travelers should be prepared to modify their itineraries or explore alternative routes if necessary, as research from the Travel Institute (2021) shows that flexibility can enhance travel experiences during chaotic situations.

Implementing these strategies can enhance preparedness and ensure smoother travel experiences despite unexpected changes in travel time.

What Tips Can I Implement to Adjust My Plans Based on Travel Time Variability?

To adjust your plans based on travel time variability, consider several strategies that enhance flexibility and prepare you for unexpected delays.

1. Build extra time into your itinerary.

2. Monitor real-time traffic updates.

3. Utilize travel planning apps.

4. Choose alternative routes.

5. Be aware of peak travel times.

6. Factor in weather conditions.

7. Keep multiple transport options available.

By understanding these strategies, you can better manage your travel plans and ensure a smoother experience.

1.Build Extra Time into Your Itinerary:
Building extra time into your itinerary involves intentionally adding buffer time to your schedule. This can help accommodate unforeseen circumstances such as traffic jams or delays at stops. Studies indicate that including an additional 30 minutes to your travel time can significantly reduce stress and improve punctuality. For example, if you anticipate a trip taking 2 hours, plan for 2.5 hours instead.

2.Monitor Real-Time Traffic Updates:
Monitoring real-time traffic updates involves using apps like Google Maps or Waze that provide live data on traffic conditions. These platforms can alert you to accidents, road closures, or delays, allowing you to make timely adjustments. Research shows that users who rely on these tools can reduce travel time by up to 15%.

3. Utilize Travel Planning Apps:
Utilizing travel planning apps assists in organizing your journey. These apps can offer estimates based on various scenarios, such as time of day and route choices. Examples include TripIt and Roadtrippers, which help streamline travel logistics and adjust to any unexpected changes.

4. Choose Alternative Routes:
Choosing alternative routes allows you to bypass congested areas. Familiarizing yourself with less-traveled roads can lead to faster travel times during peak hours. For instance, a study by INRIX in 2020 noted that motorists who utilized alternative routes saved an average of 10 minutes during rush hour.

5. Be Aware of Peak Travel Times:
Being aware of peak travel times helps you plan your journeys during off-peak hours. Traffic patterns generally peak during weekday mornings and evenings. According to the Federal Highway Administration, traveling during non-peak hours can reduce travel time by up to 30%.

6. Factor in Weather Conditions:
Factoring in weather conditions is crucial, as adverse weather can significantly impact travel time. Rain, snow, or fog can lead to longer journeys. The American Automobile Association noted that having real-time weather alerts can empower travelers to adjust plans accordingly, enhancing safety and efficiency.

7. Keep Multiple Transport Options Available:
Keeping multiple transport options available involves preparing for various scenarios. For example, if driving becomes impractical due to traffic, knowing local public transportation or rideshare options can provide alternatives. This flexibility can be critical in urban environments, where travel conditions can change rapidly.

Adapted from this site: https://travelpander.com/how-to-figure-out-travel-time/

TDL Math Outcome #8 - Activity 4, Step 4

🚚 Group 1: "Race Against Time – Trucking Across America"

Mode of Transport: Truck Driving

Objective: Plan a truck route from **Los Angeles, CA (PST)** to **Atlanta, GA (EST)** delivering produce within a set timeframe while factoring in time zones, rest breaks, and weather delays.

Instructions:

1. Each group receives a scenario: a shipment of fresh produce must arrive in 3 days.
2. Use a map of U.S. time zones and a list of potential stops and distances.
3. Plan the route, rest periods (per DOT regulations), and calculate time lost/gained crossing time zones.
4. Present route and time plan using a slide or drawing.

Students should:

- understand DOT regulations.
- apply time zone knowledge.
- practice logistics planning.

🚂 Group 2: "Railway Relay – Coast to Coast Freight"

Mode of Transport: Rail

Objective: Coordinate a freight shipment via rail from **Seattle, WA to New York, NY**, ensuring timely handoffs at major rail hubs across 4 U.S. time zones.

Instructions:

1. Each group manages one segment of the cross-country route.
2. Use a map of U.S. rail lines and hubs (provided in the PowerPoint).
3. Determine departure/arrival times in local and destination time zones.
4. Track total travel time and adjust for delays or transfers.

Students should keep:

- develop scheduling skills.
- understand rail logistics and handoffs.
- improve coordination and time conversion accuracy.

Group 3: "River, Sky, or Both? – Freight Challenge"

Modes of Transport: River & Air

Objective: Choose the most efficient way to ship goods from **St. Louis, MO (CST)** to **Miami, FL (EST)** using river barge, air freight, or a combination.

Instructions:

1. Present each group with different cargo (perishables, electronics, construction materials).
2. Use cost, speed, and cargo safety data (provided in PowerPoint).
3. Evaluate which transport mode(s) are best based on delivery deadlines and cargo needs.
4. Present a short justification of your chosen method.

Students should:

- compare and contrast transport modes.
- analyze cost vs. time vs. cargo sensitivity.
- apply critical thinking in logistics.

EffortlessMath

Math Worksheets

Name: _____

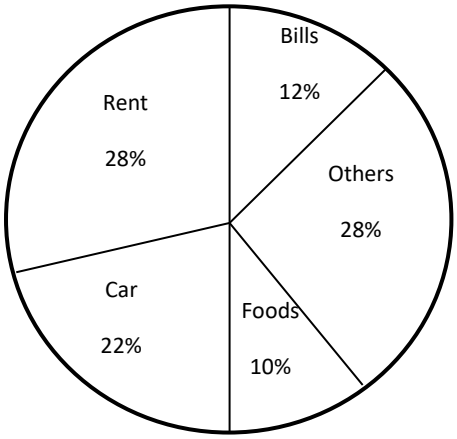
Date: _____

Pie Graph

The circle graph below shows all Jason's expenses for last month. Jason spent $300 on his bills last month.

Answer following questions based on the Pie graph.

Jason's monthly expenses



1- How much did Jason spend on his car last month? _____

2- How much did Jason spend for foods last month? _____

3- How much did Jason spend on his rent last month? _____

4- What fraction is Jason's expenses for his bills and Car out of his total expenses last month? _____

5- How much was Jason's total expenses last month? _____

Answers

Pie Graph

1) $550
2) $250
3) $700
4) $\frac{17}{50}$
5) $2,500

TDL Math Outcome #10 - Activity 1, Worksheet 1

TDL Context Scenario

You are a professional truck driver for XYZ Company. During the week, you will be transporting merchandise from the company's main distribution center in Springfield, Illinois, to various retail locations throughout the state. Truck drivers are required to use a variety of math skills to accurately complete trucker logs and company reports. You will use the Trip Planning Map (Handout #1) and the information provided in each exercise to answer the questions and complete the Trip Planning Forms (Handout #2) and Trucker's Log (Handout #3) for your employer.

Your supervisor has given you four Trip Planning Forms with the locations of the deliveries you will be making each day this week. You are required to complete and submit these forms before beginning your deliveries tomorrow morning. You are also required to submit your Trucker's Log at the end of the week. Use the Trip Planning Map to find the distance between the locations for each day and record this number in the correct column of each trip planning form. The first one has been completed for you. After completing this task, answer the following questions:

1. How many miles will you drive each day?

   Day 1 _____

   Day 2 _____

   Day 3 _____

   Day 4 _____

2. On which day will you drive the most miles?

3. On which day will you drive the least number of miles?

4. What is the difference between the miles driven on Day 4 and Day 1?

5. On day 1, how many miles will you have driven when you arrive in Effingham? Write this number as a fraction of the total miles for day 1 and reduce your answer to lowest terms. What fraction of the trip will you have left to drive that day? Convert this fraction to a decimal and round to the thousandths place.

6. On day 4, how many miles will you have driven after you arrive in Bloomington? Write this number as a fraction of the total miles for day 4 and reduce your answer to lowest terms. What fraction of the trip will you have left to drive that day? Convert this fraction to a decimal and round to the hundredths place.

7. What is the total number of miles you will drive this week?

8. What fraction of the total miles for the week will you drive on day 1? Reduce your answer to lowest terms.

9. What is the total number of miles you will drive on days 1 and 2? Write this number as a fraction of the total miles you will drive for the week and reduce your answer to lowest terms.

10. What is the total number of miles you will drive on days 3 and 4? Write this number as a fraction of the total miles you will drive for the week and reduce your answer to lowest terms.

11. What is the average number of miles per day that you will drive this week? Round your answer to the nearest whole number.

12. Truck drivers are required to maintain accurate records of their driving locations, miles, and driving times. For the purpose of this activity, you will use the locations and miles driven from your Trip Planning Forms to complete your Trucker's Log. First, enter your name in the Driver's Name box. In the Trip Record section, write the origin cities, destination cities, and miles driven in the correct columns. Add the numbers in the Miles column and record the total miles for the week in the correct space at the bottom of the column. This number should match your answer in question #_____.

TDL Math Outcome #10 – Activity 1, Worksheet 2 **Name _____**

Use an average speed of **60 mph** to calculate your estimated driving time for each leg of each daily trip. Round your answer to the nearest hundredths place, if necessary. Record your answers in the driving time column of your Trip Planning Forms. The first one has been completed for you.

1. How many hours you will spend driving each day?

   Day 1 _____

   Day 2 _____

   Day 3 _____

   Day 4 _____

2. What is the total number of hours you will spend driving this week?

3. Using the information from your trip planning forms, record the driving time for each trip for each day in the driving time column on your Trucker's Log. The first one has been entered for you.

4. Each delivery stop on your route takes approximately 1 hour to unload the truck. How many hours will you need to add to each day to determine the total hours worked for that day?

5. On day 2, you leave Springfield at 7:00 a.m., approximately what time will you return to the distribution center at the end of the day?

6. On day 2, what time should you expect to leave Naperville for your next stop in Champaign?

7. On day 4, you leave Springfield at 7:15 a.m., approximately what time will you arrive at your first stop in Peoria?

8. On day 1, you leave Springfield at 7:00 a.m. If you take a 30 minute lunch break, what time will you arrive back at the distribution center?

9. On day 3, you leave the Springfield at 7:30 a.m., approximately what time will you return at the end of the day if you take a 45 minute lunch break?

10. In addition to your drive time and unloading time at your delivery stops, you spend 1 hour each day completing your reports and logs when you return to the distribution center. What is the total number of hours you will work each day?

    Day 1 _____

    Day 2 _____

    Day 3 _____

    Day 4 _____

11. If day 5 is a holiday and you are paid for 8 hours, what is the total number of hours for which you will be paid this week?

12. Your hourly pay as a truck driver with XYZ Company is $22.50 per hour. What are your gross wages for this week? Round your answer to the nearest cent.

13. The following deductions are made from your check this week. What is the total amount of the deductions on your paycheck this week?

Federal income taxes	93.84
State income taxes	39.15
FICA withholding	54.00
Health insurance	31.00
Union dues	10.20

14. What is your net pay for the week?

TDL Math Outcome #10 – Activity 1, Worksheet 3 **Name _____**

1. At the beginning of the week, the truck odometer reading is 52,500. What will the odometer reading be at the end of:

   Day 1 _____

   Day 2 _____

   Day 3 _____

   Day 4 _____

2. Record the ending odometer reading in the appropriate space on your Trucker's Log. Calculate the total distance driven using the truck's beginning and ending odometer readings. Show your work here and record your answer in the Total Distance box on your trucker's log.

3. Your answer in question #2 should match the answer to question # _____ from Worksheet 2.

4. Your truck has a 100 gallon fuel tank capacity. The tank is full at the start of your first delivery day. Assume that your truck gets **10 mpg**. How many miles can you expect to drive on one tank of fuel?

5. Approximately how many gallons of gas will you use to make the deliveries for all 4 days?

6. If you drive 280 miles on day 1, approximately how many gallons of gas will you use?

7. What are the total miles you will drive for days 1 and 2? Approximately how many gallons of gas will be left in your tank at the end of day 2?

8. At the end of day 2, you fill your tank. How many gallons of fuel will you need to purchase?

9. The price of fuel is $3.83 per gallon. What will it cost to fill the tank? Round your answer to the nearest cent. Record this information in the fuel purchase record section of your Trucker's Log.

10. What are total miles you will drive for days 3 and 4? Approximately how many gallons of gas will you have left in your tank at the end of day 4?

11. At the end of day 4, you fill your tank again. How many gallons of fuel will you need to purchase?

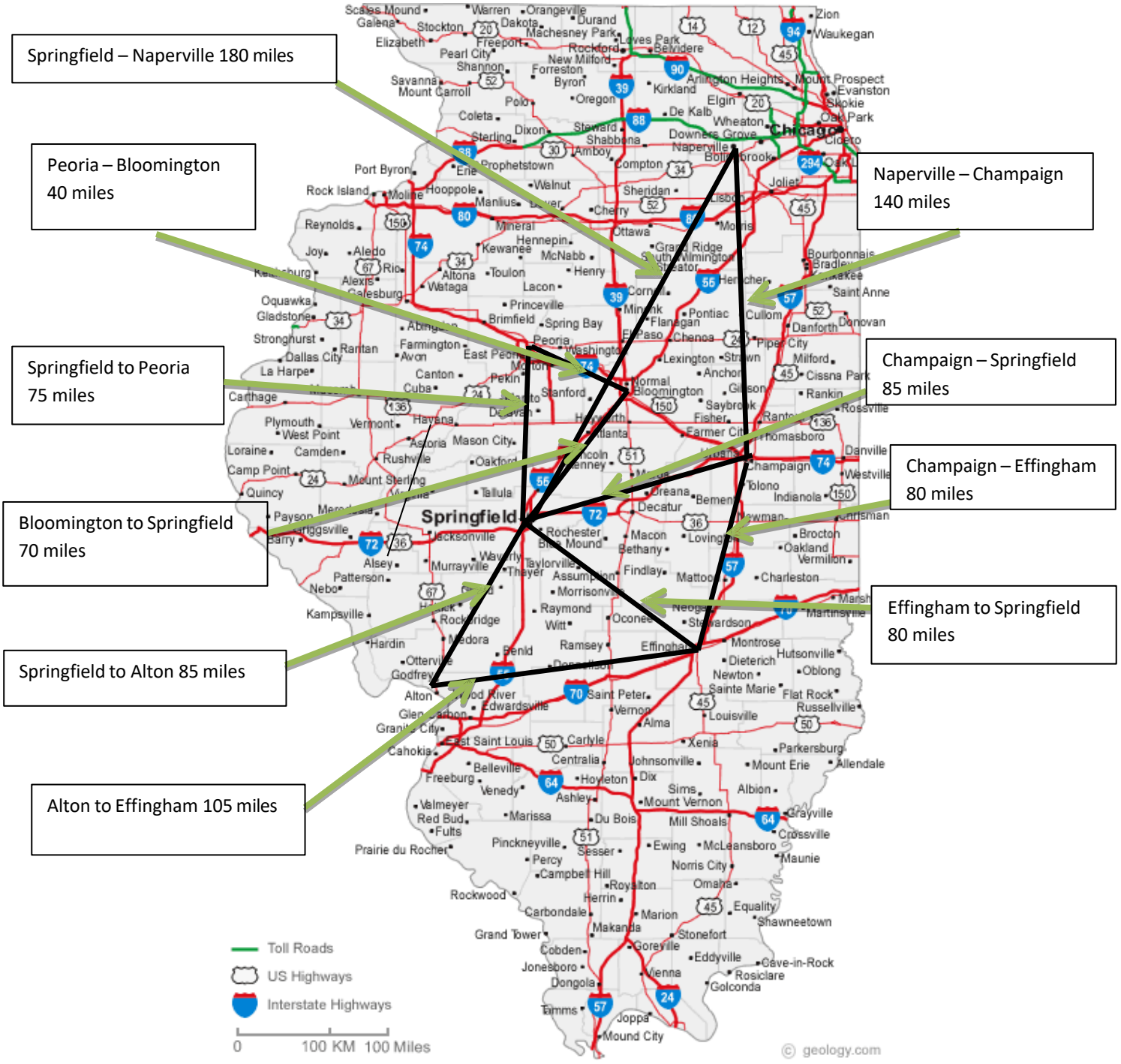
12. If the price of fuel is $3.79 per gallon, what will it cost to fill your tank? Record this information in the fuel purchase record section of your Trucker's Log.

13. What is the total cost of the two fuel purchases?

14. Using the total miles driven from your Trucker's Log and the total cost of the two fuel purchases, calculate the cost per mile of your deliveries this week.

TDL Math Outcome #10 - Activity 1, Handout #1

Trip Planning Map



TDL Math Outcome #10 - Activity 1, Handout #2 _____

Day 1 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Alton	85	1.42
Alton - Effingham		
Effingham - Springfield		

Day 2 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Naperville		
Naperville - Champaign		
Champaign - Springfield		

Day 3 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Effingham		
Effingham - Champaign		
Champaign - Springfield		

Day 4 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Peoria		
Peoria - Bloomington		
Bloomington - Springfield		

TDL Math Outcome #10 - Activity 1, Handout #3 _____

Trucker's Log

Drivers Name		Company	Week
		XYZ Company	
Truck number	**Starting Odometer Reading**	**Ending Odometer Reading**	**Total Distance**
#456	52,500		

Trip Record					
Date	**Trailer**	**Origin City**	**Destination City**	**Miles**	**Driving Time (in hours)**
	001	Springfield	Alton	85	1.42
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
	001				
Totals: Trips, Miles & Drive Time					

Fuel Purchase Record							
Date	**Odometer**	**Miles Driven**	**Gallons**	**MPG**	**Rate per Gallon**	**Total Cost**	**Notes**
Average Miles Per Gallon					**Average Cost of Fuel Per Gallon**		

TDL Math Outcome #10 - Activity 1, Worksheet 1 **Answer Key**

You are a professional truck driver for XYZ Company. During the week, you will be transporting merchandise from the company's main distribution center in Springfield, Illinois, to various retail locations throughout the state. Truck drivers are required to use a variety of math skills to accurately complete trucker's logs and company reports. You will use the Trip Planning Map (Handout #1) and the information provided in each exercise to answer the questions and complete the Trip Planning Forms (Handout #2) and Trucker's Log (Handout #3) for your employer.

Your supervisor has given you four Trip Planning Forms with the locations of the deliveries you will be making each day this week. You are required to complete and submit these forms before beginning your deliveries tomorrow morning. You are also required to submit your Trucker's Log at the end of the week. Use the Trip Planning Map to find the distance between the locations for each day and record this number in the correct column of each trip planning form. The first one has been completed for you. After completing this task, answer the following questions:

1. How many miles will you drive each day?

   Day 1: 85 + 105 + 80 = 270

   Day 2: 180 + 140 + 85 = 405

   Day 3: 90 + 80 + 85 = 255

   Day 4: 75 + 40 + 70 = 185

2. On which day will you drive the most miles? Day 2

3. On which day will you drive the least number of miles? Day 4

4. What is the difference between the miles driven on Day 3 and Day 1?
   270 – 255 = 15 miles

5. On day 1, how many miles will you have driven when you arrive in Effingham? Write this number as a fraction of the total miles for day 1 and reduce your answer to lowest terms. What fraction of the trip will you have left to drive that day? Convert this fraction to a decimal and round to the thousandths place.
   85 + 105 = 190 190/270 = 19/27 80/270 = 8/27 8 ÷ 27 = .296

6. On day 4, how many miles will you have driven after you arrive in Bloomington? Write this number as a fraction of the total miles for day 4 and reduce your answer to lowest terms. What fraction of the trip will you have left to drive that day? Convert this fraction to a decimal and round to the hundredths place.
   70 + 40 = 115 115/185 = 23/37 70/185 = 14/37 14 ÷ 37 = .38

7. What is the total number of miles you will drive this week?
   270 + 405 + 255 + 185 = 1115

8. What fraction of the total miles for the week will you drive on day 1? Reduce your answer to lowest terms.

   270/1115 = 54/223

9. What is the total number of miles you will drive on days 1 and 2? Write this number as a fraction of the total miles you will drive for the week and reduce your answer to lowest terms.

   270 + 405 = 675 675/1115 = 135/223

10. What is the total number of miles you will drive on days 3 and 4? Write this number as a fraction of the total miles you will drive for the week and reduce your answer to lowest terms.

    255 + 185 = 440 440/1115 = 88/223

11. What is the average number of miles per day that you will drive this week? Round your answer to the nearest whole number.

    1115 ÷ 4 = 278.75 → 279

12. Truck drivers are required to maintain accurate records of their driving locations, miles, and driving times. For the purpose of this activity, you will use the locations and miles driven from your Trip Planning Forms to complete your Trucker's Log. First, enter your name in the Driver's Name box. In the Trip Record section, write the origin cities, destination cities, and miles driven in the correct columns. Add the numbers in the Miles column and record the total miles for the week in the correct space at the bottom of the column. This number should match your answer in question # 7 .

TDL Math Outcome #10 - Activity 1, Worksheet 2 **Answer Key**

Use an average speed of **60 mph** to calculate your estimated driving time for each leg of each daily trip. Round your answer to the nearest hundredths place, if necessary. Record your answers in the driving time column of the Trip Planning Forms. The first one has been completed for you.

1. What is the total number of hours you will spend driving each day?

   Day 1: 85 ÷ 60 = 1.42 105 ÷ 60 = 1.75 80 ÷ 60 = 1.33 1.42 + 1.75 + 1.33 = 4.5

   Day 2: 180 ÷ 60 = 3 140 ÷ 60 = 2.33 85 ÷ 60 = 1.42 3 + 2.33 + 1.42 = 6.75

   Day 3: 90 ÷ 60 = 1.5 80 ÷ 60 = 1.33 85 ÷ 60 = 1.42 1.5 + 1.33 + 1.42 = 4.25

   Day 4: 75 ÷ 60 = 1.25 40 ÷ 60 = .67 70 ÷ 60 = 1.17 1.25 + .67 + 1.17 = 3.09

2. What is the total number of hours you will spend driving this week?

   4.5 + 6.75 + 4.25 + 3.09 = 18.59

3. Using the information from your Trip Planning Forms, record the driving time for each trip for each day in the driving time column on your Trucker's Log. The first one has been entered for you.
   Student records driving times on the Trucker's Log

4. Each delivery stop on your route takes approximately 1 hour to unload the truck. How many hours will you need to add to each day to determine the total hours worked for that day?
   1 hour x 2 stops per day = 2 hours

5. On day 2, you leave Springfield at 7:00 a.m., approximately what time will you return to the distribution center at the end of the day?
   6.75 hours (drive time) + 2 hours (unload time) = 8.75 hours 3:45 p.m.

6. On day 2, what time should you expect to leave Naperville for your next stop in Champaign?
   3 hours (drive time) + 1 hour unload time = 4 hours 11:00 a.m.

7. On day 4, you leave Springfield at 7:15 a.m., approximately what time will you arrive at your first stop in Peoria?
   1.25 hours (drive time) = 1 hour 15 minutes 8:30 a.m.

8. On day 1, you leave Springfield at 7:00 a.m. If you take a 30 minute lunch break, what time will you arrive back at the distribution center?
   4.5 hours (drive time) + 2 hours (unload time) + .5 hour (30 minute lunch) = 7 hours 2:00 p.m.

9. On day 3, you leave Springfield at 7:30 a.m., approximately what time will you return at the end of the day if you take a 45 minute lunch break?
   4.25 hours (drive time) + 2 hours (unload time) + .75 (45 minute lunch) = 7 hours 2:30 p.m.

10. In addition to your drive time and unloading time at your delivery stops, you spend 1 hour each day completing your reports and logs when you return to the distribution center. What is the total number of hours you will work each day?

    Day 1: 4.5 + 2 + 1 = 7.5

    Day 2: 6.75 + 2 + 1 = 9.75

    Day 3: 4.25 + 2 + 1 = 7.25

    Day 4: 3.09 + 2 + 1 = 6.09
    Total:

11. If day 5 is a holiday and you are paid for 8 hours, what is the total number of hours for which you will be paid this week?
    30.59 (hours worked) + 8 hours (paid holiday) = 38.59 hours

12. Your hourly pay as a truck driver with XYZ Company is $22.50 per hour. What are your gross wages for this week? Round your answer to the nearest cent.
    38.59 x 22.50 = $868.28

13. The following deductions are made from your check this week. What is the total amount of the deductions on your paycheck this week?

Federal income taxes	93.84
State income taxes	39.15
FICA withholding	54.00
Health insurance	31.00
Union dues	10.20
Total:	$228.19

14. What is your net pay for the week?
    868.28 – 228.19 = $640.09

TDL Math Outcome #10 - Activity 1, Worksheet 3 **Answer Key**

1. At the beginning of the week, the truck odometer reading is 52,500. What will the odometer reading be at the end of:

   Day 1: 52500 + 270 = 52770

   Day 2: 52770 + 405 = 55317

   Day 3: 53175 + 255 = 53430

   Day 4: 53430 + 185 = 53615

2. Record the ending odometer reading in the appropriate space on your Trucker's Log. Calculate the total distance driven using the truck's beginning and ending odometer readings. Show your work here and record your answer in the Total Distance box on your trucker's log.

   53615 – 52500 = 1115

3. Your answer in question #2 should match the answer to question # 7 from Activity 1.

4. Your truck has a 100 gallon fuel tank capacity. The tank is full at the start of your first delivery day. Assume that your truck gets **10 mpg**. How many miles can you expect to drive on one tank of fuel?
   10 miles / 1 gal. = ? miles / 100 gals. 1000 miles

5. Approximately how many gallons of gas will you use to make the deliveries for all 4 days?

   10 miles / 1 gal. = 1115 miles / ? gals. 111.5 gallons

6. If you drive 280 miles on day 1, approximately how many gallons of gas will you use?

   10 miles / 1 gal. = 280 miles / ? gals. 28 gallons

7. What are the total miles you will drive for days 1 and 2? Approximately how many gallons of gas will be left in your tank at the end of day 2?
   270 + 405 = 675 miles 10 miles/1 gal. = 675/? gals. = 67.5 gals. used 100 – 67.5 = 32.5 gals. left

8. At the end of day 2, you fill your tank. How many gallons of fuel will you need to purchase?
   100 – 32.5 = 67.5 gallons to purchase

9. The price of fuel is $3.83 per gallon. What will it cost to fill the tank? Round your answer to the nearest cent. Record this information in the fuel purchase record section of your Trucker's Log.
   67.5 gallons x 3.83 = 258.525→ $258.53

10. What are total miles you will drive for days 3 and 4? Approximately how many gallons of gas will you have left in your tank at the end of day 4?
    255 + 185 = 440 10 miles/1 gal. = 440/? gals. = 44 gals. used 100 – 44 = 56 gallons left.

11. At the end of day 4, you fill your tank again. How many gallons of fuel will you need to purchase?
    100 – 56 = 44 gallons to purchase

12. If the price of fuel is $3.79 per gallon, what will it cost to fill your tank? Record this information in the fuel purchase record section of your Trucker's Log.
    44 gallons x 3.79 = $166.76

13. What is the total cost of the two fuel purchases?
    258.53 + 166.76 = $425.29

14. Using the total miles driven from your Trucker's Log and the total cost of the two fuel purchases, calculate the cost per mile of your deliveries this week. Round your answer to the nearest cent.
    $425.29/ 1115 miles = ?/1 mile .38

TDL – Math – Outcome 10 - Activity 1 - Handout #2 **Answer Key**

Day 1 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Alton	85	1.42
Alton - Effingham	105	1.75
Effingham - Springfield	80	1.33

Day 2 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Naperville	180	3
Naperville - Champaign	140	2.33
Champaign - Springfield	85	1.42

Day 3 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Effingham	90	1.5
Effingham - Champaign	80	1.33
Champaign - Springfield	85	1.42

Day 4 Trip Planning Form

Origin City – Destination City	Distance Between (Miles)	Estimated Driving Time (Hours)
Springfield - Peoria	75	1.25
Peoria - Bloomington	40	.67
Bloomington - Springfield	70	1.17

Trucker's Log

Drivers Name Answer Key		Company XYZ Company	Week
Truck number #456	Starting Odometer Reading 52,500	Ending Odometer Reading 53615	Total Distance 1115

Trip Record

Date	Trailer	Origin City	Destination City	Miles	Driving Time (in hours)
Day 1	001	Springfield	Alton	85	1.42
Day 1	001	Alton	Effingham	105	1.75
Day 1	001	Effingham	Springfield	80	1.33
Day 2	001	Springfield	Naperville	180	3
Day 2	001	Naperville	Champaign	140	2.33
Day 2	001	Champaign	Springfield	85	1.42
Day 3	001	Springfield	Effingham	90	1.5
Day 3	001	Effingham	Champaign	80	1.33
Day 3	001	Champaign	Springfield	85	1.42
Day 4	001	Springfield	Peoria	75	1.25
Day 4	001	Peoria	Bloomington	40	.67
Day 4	001	Bloomington	Springfield	70	1.17
	001				
	001				
	001				
	001				
Totals: Trips, Miles & Drive Time			12	1115	18.59

Fuel Purchase Record

Date	Odometer	Miles Driven	Gallons	MPG	Rate per Gallon	Total Cost	Notes
Day 2	53175	675	67.5	10	3.83	258.53	
Day 4	53615	440	44	10	3.79	166.76	
			111.5			425.29	425.29 ÷ 111.5 =
Average Miles Per Gallon				**10**	**Average Cost of Fuel Per Gallon**		3.81

TDL Math Outcome #10 – Activity 2, Worksheet 1 **Name_____**

Warehousing and Distribution Center Operations - Multiplication and Division

You are a professional assigned to a warehouse distribution center. You are responsible for planning the loading and unloading of supplies/boxes. Understanding space requirements of your load and of your truck is essential. In order to interpret your space requirements, you will be required to understand the importance of multiplication and division, fractions, and volume. Understanding these concepts will be clearer using a 3-D model. Use the LEGO examples to understand the math concept and then move to application of this concept in a warehouse distribution center. You may find it helpful to work through the loading scenarios using the LEGOS as concrete examples of your task.

Your supervisor has given you seven trucks to load each day. Use the different loading instructions to decide how many boxes you will load.

Truck #1

All boxes are the same size. Load them 12 high and 8 across. How many boxes will you need to pull out of your inventory to load this truck?

Truck #2

Smaller distribution trucks arrive which you must first unload in order to fulfill the requirements of loading truck #2. Your larger truck has a capacity to carry 500 crates. Small truck A is loaded with crates 4 high and 3 across and 10 deep. Truck B has 6 high and 3 across and 10 deep. Truck C has 6 high and 4 across and 12 deep. Will all the crates from trucks A, B, and C fit in your large truck #2? What is the total number of crates from the three small trucks?

Truck #3

This truck has the capacity to hold 24 pallets. If each pallet can hold 12 boxes, how many boxes can be loaded on this truck in all? Assuming the boxes from truck #1 and the boxes from truck #3 are the same size, which truck can hold more boxes?

Truck #4

The freight for this truck is fragile and you may not load the boxes any higher than 3. You are pulling your boxes from pallets holding 3 across, 3 high and 4 deep. If the boxes fit on the truck 4 across and 10 deep, how many pallets will you use to fill your truck? Will there be any left on one of the pallets?

Truck #5

There are two sizes of boxes to load on truck #5. The smaller size boxes are half the size of the larger boxes. (Use your LEGOS to visualize these two sizes). Fill the bottom half of the truck stacking the larger boxes 2 high, 4 across, and 8 deep. Using this base as your platform for the smaller boxes, how many smaller boxes will fit on the next row?

Truck #6

The crates for this truck are very heavy weighing 725 lbs each. Truck #6 can only carry a total of 20 tons. How many crates can you load with your forklift into truck #6?

Truck #7

You are a very fast worker and usually can load a truck in 1 hour. If truck #7 needs to be loaded with 350 boxes, how many boxes do you need to load each minute to finish loading in 1 hour?

TDL – Math – Outcome 10 – Activity 2, Worksheet 2 **Name _____**

Warehousing and Distribution Center Operations - Fractions

Use fractions to help you understand the amount of freight needed and the amount of time you need to fulfill your daily truck loading goals.

Truck #1

Your truck is ¼ full with 110 boxes. How many boxes does truck #1 hold when it is full?

Truck #2

Your truck has a weight limit of 20 tons. Your truck needs to be unloaded in four different stops so you load the truck in reverse order for the delivery person. The last stop (first to load) weighs 10,500 lbs. what fraction is this of the total you need to load? What percent is it?

Truck #3

Truck #3 has 3 stops and also has a weight limit of 20 tons. After loading for the last stop (first to load), your truck has a load weight of 18,000 lbs. You know the second stop weighs only 5,000 lbs. What percent of the total are the first two stops? If the first stop (last to load) is going to be 45% of the total, are you going to meet the weight limit for this load?

Truck #4

Your work day is 6:30am to 2:30pm. You have one hour for lunch and two 15 minute breaks. What percentage of your work time will be spent loading truck #4 (assuming time for each of your 7 total trucks is evenly spread)?

Truck #5

You have already loaded truck #5 with 64 pallets which is half of the load. The second half of the load is made up of pallets twice as big as the first half. How many pallets can fit in the second half? (Use your LEGOS to visualize these two sizes).

Truck #6

Truck #6 needs to be loaded quickly so your supervisor assigns another co-worker to help you. Assuming the two of you work at the same speed, how long will it take for truck #6 to be loaded? Refer to truck #4 for your average time and percentage of your work day spent loading each truck.

Truck #7

Your truck is ¾ full with 450 boxes. How many boxes will truck #7 hold when it is full?

TDL Math Outcome #10 – Activity 2, Worksheet 3 Name _____
Warehousing and Distribution Center Operations - Volume

Use volume to help you understand the amount of freight needed and the amount of time you need to fulfill your daily truck loading goals. Remember to use Legos if this will help you visualize.

Background: Watch the video link here to help you gain an understanding of volume as related to a truck and the concept used in TDL of cubes: *Moving Truck... Volume of a Rectangular Prism*

https://www.youtube.com/watch?v=IJt4RgvDyoI Then the instructor should lead a discussion about the information discussed.

Volume – What is a Cube?

Cube
A measure of the volume of rectangular shaped three-dimensional objects or spaces. Cube is calculated by multiplying the length times the width times the height of the object or space.

Cube Out
This occurs when a container or vessel has reached its volumetric capacity before its permitted weight limit. The situation when a piece of equipment has reached its volumetric capacity before reaching the permitted weight limit.

Cube Utilization
In warehousing and logistics, cube utilization refers to the use of space within storage area, trailer, or container. Cube utilization is generally calculated as a percentage of total space or of total "usable" space.

Cubic Capacity
The carrying capacity of a piece of equipment according to measurement in cubic feet.

Cubic Foot
1,728 cubic inches. A volume contained in a space measuring one foot high, one foot wide and one foot long.

Truck #1

The interior of your truck to load measures 8 feet wide, 13 feet high, and 28 feet long. How many cubic feet (cubes) do you have available?

Truck #2

Truck #2 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your boxes measure 2 feet wide, 2 feet high, and 2 feet long. How high will you be able to stack your boxes in this truck? Why?

Truck #3

Truck #3 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your boxes measure 2 feet wide, 2 feet high, and 2 feet long. How many boxes can you plan to pack in your truck? (note: you'll only be able to load 6 boxes high)

Truck #4

Truck #4 pulled in with 2200 boxes measuring one cubic foot each. The load needs to be transferred to smaller trucks for delivery within your local area. Since each truck added to the delivery route means additional cost, your goal is to use only the trucks you really need. However, if you start loading and the load doesn't fit, that costs you time and wasted labor cost. So which combination of trucks is the best choice for you to send out for local delivery?

Truck A – 7.5 feet wide, 8 feet high, and 21 feet long

Truck B - 7.5 feet wide, 6.5 feet high, and 16.5 feet long

Truck C - 7.5 feet wide, 8 feet high, and 25 feet long

Truck D – 6. 5 feet wide, 6 feet high, and 12 feet long

Truck #5

Truck #5's measurements are: 8 feet wide, 13 feet high, and 28 feet long. If this truck pulls in full of cargo, which trucks from your small fleet should you use to distribute this cargo locally?

Truck A – 7.5 feet wide, 8 feet high, and 21 feet long

Truck B - 7.5 feet wide, 6.5 feet high, and 16.5 feet long

Truck C - 7.5 feet wide, 8 feet high, and 25 feet long

Truck D – 6. 5 feet wide, 6 feet high, and 12 feet long

Truck #6

Truck # 6 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your cargo is 2900 cubes. Will it fit in truck #6?

Truck #7

Truck #7 also measures 8 feet wide, 13 feet high and 36 feet long. Two smaller trucks arrive. Will both trucks' cargo fit on truck #7?

Truck E = 7.5 feet wide, 8 feet high, and 25 feet long

Truck F– 6. 5 feet wide, 6 feet high, and 12 feet long

TDL Math Outcome #10 – Activity 2, Worksheet 1 **ANSWER KEY**
Warehousing and Distribution Center Operations - Multiplication and Division

TDL Context Scenario

You are a professional assigned to a warehouse distribution center. You are responsible for planning the loading and unloading of supplies/boxes. Understanding space requirements of your load and of your truck is essential. In order to interpret your space requirements, you will be required to understand the importance of multiplication and division, fractions, and volume. Understanding these concepts will be clearer using a 3-D model. Use the LEGO examples to understand the math concept and then move to application of this concept in a warehouse distribution center. You may find it helpful to work through the loading scenarios using LEGOS as concrete examples of your task.

Your supervisor has given you seven trucks to load each day. Use the different loading instructions to decide how many boxes you will load.

Truck #1

All boxes are the same size. Load them 12 high and 8 across. How many boxes will you need to pull out of your inventory to load this truck?

12 x 8 = 96

Truck #2

Smaller distribution trucks arrive which you must first unload in order to fulfill the requirements of loading truck #2. Your larger truck has a capacity to carry 500 crates. Small truck A is loaded with crates 4 high and 3 across and 10 deep. Truck B has 6 high and 3 across and 10 deep. Truck C has 6 high and 4 across and 12 deep. Will all the crates from trucks A, B, and C fit in your large truck #2? What is the total number of crates from the three small trucks?

Truck A = 4 x 3 x 10 = 120 Truck B = 6 x 3 x 10 = 180 Truck C = 6 x 4 x 12 =288

120 + 180 + 288 = 588 (total of Trucks A, B, C) No, all three trucks won't fit in Truck #2

Truck #3

This truck has the capacity to hold 24 pallets. If each pallet can hold 12 boxes, how many boxes can be loaded on this truck in all? Assuming the boxes from truck #1 and the boxes from truck #3 are the same size, which truck can hold more boxes?

24 x 12 = 288 Truck #3 can hold more

Truck #4

The freight for this truck is fragile and you may not load the boxes any higher than 3. You are pulling your boxes from pallets holding 3 across, 3 high and 4 deep. If the boxes fit on the truck 4 across and 10 deep, how many pallets will you use to fill your truck? Will there be any left on one of the pallets?

Total capacity of Truck #4 = 4 x 10 x3 = 120

Pallet capacity = 3 x 3 x 4 = 36

Total pallets for Truck #4 = 120 ÷ 36 = 3 pallets plus 12 from pallet 4 leaving 24 boxes leftover on pallet 4

Truck #5

There are two sizes of boxes to load on truck #5. The smaller size boxes are half the size of the larger boxes. (Use your LEGOS to visualize these two sizes). Fill the bottom half of the truck stacking the larger boxes 2 high, 4 across, and 8 deep. Using this base as your platform for the smaller boxes, how many smaller boxes will fit on the next row?

4 x 8 = 32 bottom level covering the truck

32 x 2 = 64 smaller boxes fit over this platform

Truck #6

The crates for this truck are very heavy weighing 725 lbs each. Truck #6 can only carry a total of 20 tons. How many crates can you load with your forklift into truck #6?

20 tons = 40,000 lbs

40,000 ÷ 725 = 55.17 so 55 crates can be loaded

Truck #7

You are a very fast worker and usually can load a truck in 1 hour. If truck #7 needs to be loaded with 350 boxes, how many boxes do you need to load each minute to finish loading in 1 hour?

1 hour = 60 minutes

350 ÷ 60 = 5.8 (almost 6 a minute)

TDL Math Outcome #10 – Activity 2, Worksheet 2 **ANSWER KEY**
Warehousing and Distribution Center Operations - Fractions

Use fractions to help you understand the amount of freight needed and the amount of time you need to fulfill your daily truck loading goals.

Truck #1

Your truck is ¼ full with 110 boxes. How many boxes does truck #1 hold when it is full?

110 x 4 = 440

Truck #2

Your truck has a weight limit of 20 tons. Your truck needs to be unloaded in four different stops so you load the truck in reverse order for the delivery person. The last stop (first to load) weighs 10,500 lbs. what fraction is this of the total you need to load? What percent is it?

20 tons = 40,000 lbs

10,500 ÷ 40,000 = estimated math = about ¼ actual math 26/100 reduces to 13/50 26%

Truck #3

Truck #3 has 3 stops and also has a weight limit of 20 tons. After loading for the last stop (first to load), your truck has a load weight of 18,000 lbs. You know the second stop weighs only 5,000 lbs. What percent of the total are the first two stops? If the first stop (last to load) is going to be 45% of the total, are you going to meet the weight limit for this load?

20 tons = 40,000 lbs

18,000 + 5,000 = 23,000 lbs 23,000 ÷ 40,000 57.5%

57.5% + 45% = 102.5% TOO HEAVY

Truck #4

Your work day is 6:30am to 2:30pm. You have one hour for lunch and two 15 minute breaks. What percentage of your work time will be spent loading truck #4 (assuming time for each of your 7 total trucks is evenly spread)?

6:30- 2:30 = 8 hours 60 + 15 + 15 = 90 minutes breaks (1 ½ hours) 8 – 1 ½ = 6 ½ or 6.5 hours or 390 minutes

390 minutes ÷ 7 trucks = 55.71 minutes per truck

55.71÷390 minutes = 0.1428 X 100% = 14.28% of time for each truck

Truck #5

You have already loaded truck #5 with 64 pallets which is half of the load. The second half of the load is made up of pallets twice as big as the first half. How many pallets can fit in the second half? (Use your LEGOS to visualize these two sizes).

½ of 64 = 32 or 64 ÷ 2 = 32

Truck #6

Truck #6 needs to be loaded quickly so your supervisor assigns another co-worker to help you. Assuming the two of you work at the same speed, how long will it take for truck #6 to be loaded? Refer to truck #4 for your average time and percentage of your work day spent loading each truck.

6:30- 2:30 = 8 hours 60 + 15 + 15 = 90 minutes breaks (1 ½ hours) 8 – 1 ½ = 6 ½ or 6.5 hours or 390 minutes

390 ÷ 7 = 14.28% of time for each truck

14.28% ÷ 2 = 7.14% 390 x 7.14% (which is 0.0714) = 27.84 or, with rounding, about 28 minutes of your day

Truck #7

Your truck is ¾ full with 450 boxes. How many boxes will truck #7 hold when it is full?

450 ÷ ¾ so…. 450 ÷ .75 = 600

TDL Math Outcome #10 – Activity 2, Worksheet 3 **ANSWER KEY**
Warehousing and Distribution Center Operations - Volume

Activity 3

Use volume to help you understand the amount of freight needed and the amount of time you need to fulfill your daily truck loading goals. Remember to use Legos if this will help you visualize

Background:

Watch the video link here to help you gain an understanding of volume as related to a truck and the concept used in TDL of "cubes": *Moving Truck... Volume of a Rectangular Prism* **https://www.youtube.com/watch?v=lJt4RgvDyoI**

Volume – What is a Cube?
Cube
A measure of the volume of rectangular shaped three-dimensional objects or spaces. Cube is calculated by multiplying the length times the width times the height of the object or space.

Cube Out
This occurs when a container or vessel has reached its volumetric capacity before its permitted weight limit. The situation when a piece of equipment has reached its volumetric capacity before reaching the permitted weight limit.

Cube utilization
In warehousing and logistics, cube utilization refers to the use of space within storage area, trailer, or container. Cube utilization is generally calculated as a percentage of total space or of total "usable" space.

Cubic Capacity
The carrying capacity of a piece of equipment according to measurement in cubic feet.

Cubic Foot
1,728 cubic inches. A volume contained in a space measuring one foot high, one foot wide and one foot long.

Truck #1

The interior of your truck to load measures 8 feet wide, 13 feet high, and 28 feet long. How many cubic feet (cubes) do you have available?

8 x 13 x 28 = 2912 cubic feet (cubes)

Truck #2

Truck #2 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your boxes measure 2 feet wide, 2 feet high, and 2 feet long. How high will you be able to stack your boxes in this truck? Why?

Each box is 2 feet high so you'll only be able to load 6 boxes high. At that point you'll be 12 feet high and won't be able to add any more 2 feet tall boxes.

Truck #3

Truck #3 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your boxes measure 2 feet wide, 2 feet high, and 2 feet long. How many boxes can you plan to pack in your truck? (note: you'll only be able to load 6 boxes high)

Cubic capacity of truck = 8 x 12 x 36 = 3456 cubic feet (note that 13 high was changed to 12 high for the purposes of calculation because each box is 2 feet high so you'll only be able to load 6 boxes high)

2 x 2 x 2 = 8 cubic feet for each box (cubes) 3456 ÷ 8 = 432 boxes

Truck #4

Truck #4 pulled in with 2200 boxes measuring one cubic foot each. The load needs to be transferred to smaller trucks for delivery within your local area. Since each truck added to the delivery route means additional cost, your goal is to use only the trucks you really need. However, if you start loading and the load doesn't fit, that costs you time and wasted labor cost. So which combination of trucks is the best choice for you to send out for local delivery?

Truck A – 7.5 feet wide, 8 feet high, and 21 feet long

Truck B - 7.5 feet wide, 6.5 feet high, and 16.5 feet long

Truck C - 7.5 feet wide, 8 feet high, and 25 feet long

Truck D – 6. 5 feet wide, 6 feet high, and 12 feet long

Truck A holds 1260 cubic feet (cubes)
Truck B holds 804 cubic feet (cubes)
Truck C holds 1500 cubic feet (cubes)
Truck D holds 468 cubic feet (cubes)
Trucks B and C can hold 2304 cubic feet which is large enough for all the cargo using the smallest trucks and the least number of trucks.

Truck #5

Truck #5's measurements are: 8 feet wide, 13 feet high, and 28 feet long. If this truck pulls in full of cargo, which trucks from your small fleet should you use to distribute this cargo locally?

Truck A – 7.5 feet wide, 8 feet high, and 21 feet long

Truck B - 7.5 feet wide, 6.5 feet high, and 16.5 feet long

Truck C - 7.5 feet wide, 8 feet high, and 25 feet long

Truck D – 6. 5 feet wide, 6 feet high, and 12 feet long

Truck A holds 1260 cubic feet (cubes)
Truck B holds 804 cubic feet (cubes)
Truck C holds 1500 cubic feet (cubes)
Truck D holds 468 cubic feet (cubes)
Truck #5 = 8 x 13 x 28 = 2912 cubic feet (cubes)
Trucks A, C, and D = 3228 which will accommodate truck #5's load

Truck #6

Truck # 6 has the following measurements: 8 feet wide, 13 feet high, and 36 feet long. Your cargo is 2900 cubes. Will it fit in truck #6?

Yes
Truck #6 - 8 feet wide, 13 feet high, and 36 feet long = 3744 cubic feet (cubes)

Truck #7

Truck #7 also measures 8 feet wide, 13 feet high and 36 feet long. Two smaller trucks arrive. Will both trucks' cargo fit on truck #7?

Truck E = 7.5 feet wide, 8 feet high, and 25 feet long

Truck F– 6. 5 feet wide, 6 feet high, and 12 feet long

Yes
Truck E = 1500 cubic feet (cubes)
Truck F– 468 cubic feet (cubes)

TDL Math Outcome #10 - Activity 3, Worksheet 1 **Name _____**

TDL Context Scenario

As the staffing logistics manager for BSP Delivery Company, you are responsible for staffing three major delivery centers. You received a memo from the vice president of the logistics management department informing you that the company has signed new contracts from online retail vendors that will increase the quantity of packages these delivery hubs will handle each month. She has asked you to calculate the number of employees that will be needed to operate each delivery hub with this increase in business. You will use the information provided in the BSP Interoffice Memorandum (Handout #1), and each activity to solve the math problems involved in this project and prepare a written Staffing Logistics Report (Handout #2) for the next logistics management meeting.

Your first step in this project will be to calculate the amount and percent of increase for each delivery hub and the total amount of increase and percent of increase for all three delivery centers together. Use the information provided in the handouts and exercises to complete all the tasks and answer all the questions.

1. Read the BSP Interoffice Memorandum (**Handout #1**). Enter the current number of packages handled and the new number of packages to be handled at each delivery hub on the Staffing Logistics Report (**Handout #2**). Calculate the amount of increase and the percent of increase for each delivery hub. Round your answer to the nearest tenths place, if necessary. Record your answers in the appropriate columns of the staffing logistics report.

2. Calculate the total amount of packages currently handled at all three delivery hubs. Enter this total on the staffing logistics report.

3. Compute the total number of new packages to be handled and delivered at the three delivery hubs altogether. Enter this total on the staffing logistics report.

4. What is the total amount of increase in the number of packages for all three delivery hubs together? Record your answer on the staffing logistics report.

5. What is the total percent of increase for all three delivery hubs together? Round your answer to the nearest tenths place and enter it on the report.

6. Which delivery hub currently handles and delivers the largest number of packages each month?

7. Which delivery hub currently handles and delivers the smallest number of packages each month?

8. Which delivery hub will have the largest percent increase in the number of packages per month?

9. Which delivery will have the smallest percent increase in the number of packages per month?

10. Which delivery hub will have the same percent of increase per month as all three hubs together?

TDL Math Outcome #10 – Activity 3, Worksheet 2 **Name _____**

Each delivery hub employs dock workers to unload packages from freight trucks. For the next step in your project, you will need to calculate the current productivity rates for the dock workers employed at each hub. You will then calculate the average productivity rate for a dock worker at all three delivery hubs. This average rate will be used to compute the number of new dock workers that the company will need to hire at each location. Make sure you record your answers in the Staffing Logistics Report (Handout #2).

1. At the northern hub, 3 dock workers unload 410 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

2. At the central hub, 4 dock workers unload 500 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and record it in the correct space on the staffing logistics report

3. At the southern hub, 3 dock workers unload 400 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and record it in the correct space on the staffing logistics report.

4. Which delivery hub has the highest productivity rate per dock worker? Which delivery hub has the lowest productivity rate per dock worker?

   Highest rate _____

   Lowest rate _____

5. What is total number of freight trucks unloaded at all three hubs together? What is the total number of dock workers employed at all three hubs together? Use this information to calculate the average unload rate per dock worker for all three delivery hubs together. Enter your answers on the staffing logistics report.

6. With the increased business, the northern hub will have about 550 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

7. The central hub will have about 575 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

8. The southern hub will have about 520 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

9. Calculate the number of dock workers you will need to hire for each delivery hub and record your answers in the staffing logistics report. At which hub will you NOT have to hire any dock workers?

10. What is the percent increase in dock workers for the other two delivery hubs? Round your answers to the nearest tenths place, if necessary. Record these numbers on the staffing logistics report.

11. What is the total number of dock workers BSP will have to hire? Record this number on the staffing logistics report.

12. What is the percent increase in dock workers for all three hubs together? Record your answer on the staffing logistics report.

TDL Math Outcome #10 – Activity 3, Worksheet 3 **Name _____**

Each delivery hub employs package handlers to sort and load packages onto the outgoing delivery trucks. The next task for your project will be to calculate the current productivity rates for the package handlers working at each hub. You will then compute the average productivity rate for a package handler at all three delivery hubs. This average rate will be used to calculate the number of new package handlers that the company will need to hire at each location. Make sure you record your answers in the Staffing Logistics Report (Handout #2).

1. At the northern hub, 15 package handlers sort and load 175,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

2. At the central hub, 16 package handlers sort and load 190,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

3. At the southern hub, 13 package handlers sort and load 160,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

4. Which delivery hub has the highest productivity rate per package handler?

5. What is total number of packages sorted and loaded at all three hubs together? What is the total number of package handlers employed at all three hubs together? Use this information to compute the average productivity rate per package handler at BSP Delivery. Enter your answers on the staffing logistics report.

6. With the increased business, the northern hub will have about 220,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

7. With the increased business, the central hub will have about 230,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

8. With the increased business, the southern hub will have about 210,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

9. How many package handlers will you need to hire for each delivery hub? Record your answers in the staffing logistics report. At which hub will you have to hire the largest number of package handlers?

10. What is the percent increase in package handlers for each delivery hub? Record your answers on the staffing logistics report.

11. What is the total number of package handlers BSP will have to hire? Record this number on the staffing logistics report.

12. What is the percentage of increase in package handlers for all three hubs together? Record your answer on the staffing logistics report.

TDL Math Outcome #10 – Activity 3, Worksheet 4 Name _____

Each delivery hub employs drivers to deliver packages to customers. For this task, you will need to calculate the current productivity rates for the delivery drivers employed at each hub. You will then compute the average productivity rate for a driver at all three delivery hubs. This average rate will be used to determine the number of new drivers that the company will need to hire at each location. Make sure you record your answers in the **staffing logistics report** (Handout #2).

1. At the northern hub, 35 drivers deliver 175,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

2. At the central hub, 40 drivers deliver 190,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

3. At the southern hub, 30 drivers deliver 160,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

4. Which hub has the highest productivity rate per delivery driver? Which hub has the lowest productivity rate? What is the difference between the productivity rates at these two locations?

5. What is total number of packages delivered for all three hubs together? What is the total number of delivery drivers employed at all three hubs together? Use this information to calculate the average productivity rate per driver at BSP Delivery. Enter your answers on the staffing logistics report.

6. With the increased business, the northern hub will have about 220,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

7. With the increased business, the central hub will have about 230,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

8. With the increased business, the southern hub will have about 210,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

9. How many drivers will you need to hire for each delivery hub? Record your answers in the staffing logistics report. At which hub will you have to hire the largest number of delivery drivers?

10. What is the percent increase in drivers for each delivery hub? Record your answers on the staffing logistics report.

11. What is the total number of delivery drivers BSP will have to hire? What is the percent increase in drivers for all three hubs together? Record your answers on the staffing logistics report.

12. What is the total number of new employees BSP will have to hire? What is the percentage of increase in the total number of employees?

BSP Delivery Company

Staffing Logistics Department

123 BPS Street
Central City, IL 12345

Interoffice Memorandum

To: Hal Street, Staffing Logistics Manager

From: Samatha Gold, VP Logistics Management Department

Problem:

The company has just signed new contracts with online retail vendors that will increase the number of packages handled at our delivery centers as outlined below. As the Staffing Logistics Manager, you are responsible for determining the number of employees we will need to operate these delivery hubs. After you have completed your calculations, you will need to present your staffing logistics report at our next department meeting.

	Current # of Packages	New # of Packages
Northern Center	175,000	220,000
Central Center	190,000	230,000
Southern Center	160,000	210,000

Please contact me if you have any questions.

TDL Math Outcome #10 – Activity 3, Handout #2

BSP Delivery Service **Staffing Logistics Report**

Overall Increase in Package Handling and Delivery

Delivery Center	Current Amount of Packages Handled and Delivered per Month	New Amount of Packages to be Handled and Delivered per Month	Amount of increase	Percent of Increase
Northern Hub				
Central Hub				
Southern Hub				
Totals				

Dock Workers

Delivery Center	Dock Workers	Freight Trucks per Month	Productivity Rate: Freight Trucks per month/per Dock Worker	Freight Trucks per Month after the increase in business	Total number of Dock Workers needed after the increase in Business	Total number of Dock Workers to be Hired	Percent of Increase
Northern Hub	3	410		550			
Central Hub	4	500		575			
Southern Hub	3	400		520			
Totals							

Package Handlers

Delivery Center	Package Handlers	Packages Handled per Month	Productivity Rate: Packages per month/per Package Handler	Packages Handled per Month after the increase in business	Total number of Package Handlers needed after the increase in business	Total number of Package Handlers to be Hired	Percent of Increase
Northern Hub	15	175,000		220,000			
Central Hub	16	190,000		230,000			
Southern Hub	13	160,000		210,000			
Totals							

Delivery Drivers

Delivery Center	Delivery Drivers	Packages Delivered per month	Productivity Rate: Packages Delivered per month/per Driver	Packages Delivered per Month after the increase in business	Total number of Drivers needed after the increase in business	Total number of Drivers to be Hired	Percent of Increase
Northern Hub	35	175,000		220,000			
Central Hub	40	190,000		230,000			
Southern Hub	30	160,000		210,000			
Totals							

TDL Math Outcome #10 - Activity 3, Worksheet 1 **ANSWER KEY**

TDL Context Scenario

As a staffing logistics manager for BSP Delivery Company, you are responsible for staffing three major delivery centers. You received a memo from the vice president of the logistics management department informing you that the company has signed new contracts from online retail vendors that will increase the quantity of packages these delivery hubs will handle each month. She has asked you to calculate the number of employees that will be needed to operate each delivery hub with this increase in business. You will use the information provided in the BSP Interoffice Memorandum (Handout #1), and each activity to solve the math problems involved in this project and prepare a written Staffing Logistics Report (Handout #2) for the next logistics management meeting.

Your first step in this project will be to calculate the amount and percent of increase for each delivery hub and the total amount of increase and percent of increase for all three delivery centers together. Use the information provided in the handouts and exercises to complete all the tasks and answer all the questions.

1. Read the BSP Interoffice Memorandum (**Handout #1**). Enter the current number of packages handled and the new number of packages to be handled at each delivery hub on the Staffing Logistics Report (**Handout #2**). Calculate the amount of increase and the percent of increase for each delivery hub. Round your answer to the nearest tenths place, if necessary. Record your answers in the appropriate columns of the report.

   Northern Hub increase: 220,000-175,000 = 45,000 45,000/175,000 = 25.7%
   Central Hub increase: 230,000-190,000 = 40,000 40,000/190,000 = 21.1%
   Southern Hub increase: 210,000-160,000 = 50,000 50,000/160,000 = 31.3%

2. Calculate the total amount of packages currently handled at all three delivery hubs? Enter this total on the staffing logistics report.

   175,000 + 190,000 + 160,000 = 525,000

3. Compute the total number of new packages to be handled and delivered at the three delivery hubs altogether. Enter this total on the staffing logistics report.
   220,000 + 230,000 + 210,000 = 660,000

4. What is the total amount of increase in the number of packages for all three delivery hubs together? Record your answer on the staffing logistics report.
   660,000 – 525,000 = 135,000

5. What is the total percent of increase for all three delivery hubs together? Round your answer to the nearest tenths place and enter it on the report.
   135,000/525,000 = 25.7%

6. Which delivery hub currently handles and delivers the largest number of packages each month?
   Central

7. Which delivery hub currently handles and delivers the smallest number of packages each month?
   Southern

8. Which delivery hub will have the largest percent increase in the number of packages per month?
   Southern

9. Which delivery will have the smallest percent increase in the number of packages per month?
   Central

10. Which delivery hub will have the same percent increase per month as all three hubs together?
    Northern

TDL Math Outcome #10 - Activity 3, Worksheet 2 **ANSWER KEY**

Each delivery hub employs dock workers to unload packages from freight trucks. For the next step in your project, you will need to calculate the current productivity rates for the dock workers employed at each hub. You will then calculate the average productivity rate for a dock worker at all three delivery hubs. This average rate will be used to compute the number of new dock workers that the company will need to hire at each location. Make sure you record your answers in the Staffing Logistics Report (Handout #2).

1. At the northern hub, 3 dock workers unload 410 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   410/3 = n/1 137

2. At the central hub, 4 dock workers unload 500 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and record it in the correct space on the staffing logistics report

   500/4 = n/1 125

3. At the southern hub, 3 dock workers unload 400 freight trucks per month. How many freight trucks does 1 dock worker unload per month? Round your answer to the nearest whole number and record it in the correct space on the staffing logistics report.

   400/3 = n/1 133

4. Which delivery hub has the highest productivity rate per dock worker? Which delivery hub has the lowest productivity rate per dock worker?

   Highest rate: Northern 137 per month

   Lowest rate: Central 125 per month

5. What is total number of freight trucks unloaded at all three hubs together? What is the total number of dock workers employed at all three hubs together? Use this information to calculate the average unload rate per dock worker for all three delivery hubs together. Enter your answers on the staffing logistics report.

   Freight trucks: 410 + 500 + 400 = 1310 Dock workers: 3 + 4 + 3 = 10
   Productivity rate: 1310/10 = n/1 131

6. With the increased business, the northern hub will have about 550 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   131/1 = 550/n 4.19 → 4

7. The central hub will have about 575 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   131/1 = 575/n 4.39 → 4

8. The southern hub will have about 520 freight trucks to unload per month. Use the average unload rate per dock worker from question #5 to calculate how many dock workers will be needed to unload the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   131/1 = 520/n 3.97 → 4

9. Calculate the number of dock workers you will need to hire for each delivery hub and record your answers in the staffing logistics report. At which hub will you NOT have to hire any dock workers?

   Central

10. What is the percent increase in dock workers for the other two delivery hubs? Round your answer to the nearest tenths place, if necessary. Record these numbers on the staffing logistics report.

    Northern 1/3 = 33.3% Southern 1/3 = 33.3%

11. What is the total number of dock workers BSP will have to hire? Record this number on the staffing logistics report.

    2

12. What is the percent increase in dock workers for all three hubs together? Record your answer on the staffing logistics report.

    2/10 = 20%

TDL Math Outcome #10 - Activity 3, Worksheet 3 **ANSWER KEY**

Each delivery hub employs package handlers to sort and load packages onto the outgoing delivery trucks. The next task for your project will be to calculate the current productivity rates for the package handlers working at each hub. You will then compute the average productivity rate for a package handler at all three delivery hubs. This rate will be used to calcuate the number of new package handlers that the company will need to hire at each location. Make sure you record your answers in the Staffing Logistics Report (Handout #2).

1. At the northern hub, 15 package handlers sort and load 175,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   175,000/15 = n/1 11667

2. At the central hub, 16 package handlers sort and load 190,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   190,000/16 = n/1 11875

3. At the southern hub, 13 package handlers sort and load 160,000 packages per month. What is the monthly rate of packages sorted and loaded for 1 package handler? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   160,000/13 = n/1 12308

4. Which delivery hub has the highest productivity rate per package handler?

   Southern

5. What is total number of packages sorted and loaded at all three hubs together? What is the total number of package handlers employed at all three hubs together? Use this information to compute the average productivity rate per package handler at BSP Delivery. Enter your answers on the staffing logistics report.

   Total packages = 525,000 Total handlers = 44

   Productivity rate: 525,000/44 = n/1 11932

6. With the increased business, the northern hub will have about 220,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   11932/1 = 220,000/n 18.44→18

7. With the increased business, the central hub will have about 230,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   11932/1 = 230,000/n 19.27→19

8. With the increased business, the southern hub will have about 210,000 packages to sort and load per month. Use the average rate per package handler from question #5 to calculate how many package handlers will be needed to sort and load the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   11932/1 = 210,000/n 17.6→18

9. How many package handlers will you need to hire for each delivery hub? Record your answers in the staffing logistics report. At which hub will you have to hire the largest number of package handlers?

   Northern: 3 Central: 3 Southern: 5 largest number to be hired: Southern hub

10. What is the percent increase in package handlers for each delivery hub? Round your answer to the nearest tenths place and record your answers on the staffing logistics report.

    Northern: 3/15 = 20% Central: 3/16 = 18.8% Southern: 5/13 = 38.5%

11. What is the total number of package handlers BSP will have to hire? Record this number on the staffing logistics report.

    3 + 3 + 5 = 11 or 55 – 44 = 11

12. What is the percentage of increase in package handlers for all three hubs together? Record your answer on the staffing logistics report.
    11/44 = 25%

TDL Math Outcome #10 - Activity 3, Worksheet 4 **ANSWER KEY**

Each delivery hub employs drivers to deliver packages to customers. For this task, you will need to calculate the current productivity rates for the delivery drivers employed at each hub. You will then compute the average productivity rate for a driver at all three delivery hubs. This rate will be used to determine the number of new drivers that the company will need to hire at each location. Make sure you record your answers in the **staffing logistics report** (Handout #2).

1. At the northern hub, 35 drivers deliver 175,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   175,000/35 = n/1 5000

2. At the central hub, 40 drivers deliver 190,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   190,000/40 = n/1 4750

3. At the southern hub, 30 drivers deliver 160,000 packages per month. What is the monthly rate of packages delivered for 1 driver? Round your answer to the nearest whole number and enter it in the correct space on the staffing logistics report.

   160,000/30 = n/1 5333

4. Which hub has the highest productivity rate per delivery driver? Which hub has the lowest productivity rate? What is the difference between the productivity rates at these two locations?

   Highest: Southern Lowest: Central Difference: 5333 – 4750 = 583

5. What is total number of packages delivered for all three hubs together? What is the total number of delivery drivers employed at all three hubs together? Use this information to calculate the average productivity rate per driver at BSP Delivery. Enter your answers on the staffing logistics report.

   Total packages: 525,000 Total # of Drivers: 35 + 40 + 30 = 105

   Average productivity rate: 525,000/105 = n/1 5000

6. With the increased business, the northern hub will have about 220,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   5000/1 = 220,000/n 44

7. With the increased business, the central hub will have about 230,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   5000/1 = 230,000/n 46

8. With the increased business, the southern hub will have about 210,000 packages to deliver each month. Use the average rate per driver from question #5 to calculate how many drivers will be needed to deliver the packages. Round your answer to the nearest whole number and record it on the staffing logistics report.

   5000/1 = 210,000/n 42

9. How many drivers will you need to hire for each delivery hub? Record your answers in the staffing logistics report. At which hub will you have to hire the largest number of delivery drivers?

   Northern: 44 – 35 = 9 Central: 46 – 40 = 6 Southern: 42 – 30 = 12
   Largest # of drivers to be hired: Southern hub

10. What is the percent increase in drivers for each delivery hub? Record your answers on the staffing logistics report.

    Northern: 9/35 = 25.7% Central: 6/40 = 15% Southern: 12/30 = 40%

11. What is the total number of delivery drivers BSP will have to hire? What is the percent of increase in drivers for all three hubs together? Record your answers on the staffing logistics report.

    9 + 6 + 12 = 27 or 132 – 105 = 27 27/105 = 25.7%

12. What is the total number of new employees BSP will have to hire? What is the percent of increase in the total number of employees?
    2 + 11 +27 = 40 40/159 = 25.2%

 Answer Key

BSP Delivery Service **Staffing Logistics Report**

Overall Increase in Package Handling and Delivery

Delivery Center	Current Amount of Packages Handled and Delivered per Month	New Amount of Packages to be Handled and Delivered per Month	Amount of increase	Percent of Increase
Northern Hub	175,000	220,000	45,000	25.7%
Central Hub	190,000	230,000	40,000	21.1%
Southern Hub	160,000	210,000	50,000	31.3%
Totals	525,000	660,000	135,000	25.7%

Dock Workers

Delivery Center	Dock Workers	Freight Trucks per Month	Productivity Rate: Freight Trucks per month/per Dock Worker	Freight Trucks per Month after the increase in business	Total number of Dock Workers needed after the increase in business	Total number of Dock Workers to be Hired	Percent of Increase
Northern Hub	3	410	137/1	550	4	1	33.3%
Central Hub	4	500	125/1	575	4	0	0%
Southern Hub	3	400	133/1	520	4	1	33.3%
Totals	10	1310	131/1	1645	12	2	20%

Package Handlers **Answer Key**

Delivery Center	Package Handlers	Packages Handled per Month	Productivity Rate: Packages per month/per Package Handler	Packages Handled per Month after the increase in business	Total number of Package Handlers needed after the increase in business	Total number of Package Handlers to be Hired	Percent of Increase
Northern Hub	15	175,000	11667/1	220,000	18	3	20%
Central Hub	16	190,000	11875/1	230,000	19	3	18.8%
Southern Hub	13	160,000	12308/1	210,000	18	5	38.5%
Totals	44	525,000	11932/1	660,000	55	11	25%

Delivery Drivers

Delivery Center	Delivery Drivers	Packages Delivered per month	Productivity Rate: Packages Delivered per month/per Driver	Packages Delivered per Month after the increase in business	Total number of Drivers needed after the increase in business	Total number of Drivers to be Hired	Percent of Increase
Northern Hub	35	175,000	5000/1	220,000	44	9	25.7%
Central Hub	40	190,000	4750/1	230,000	46	6	15%
Southern Hub	30	160,000	5333/1	210,000	42	12	40%
Totals	105	525,000	5000/1	660,000	132	27	25.7%