

Lesson 20: Writing and Evaluating Expressions—Multiplication and Division

Classwork

Example 1

1. The farmers' market is selling bags of apples. In every bag, there are 3 apples.
- a. Complete the table.

Number of Bags	Total Number of Apples
1	3
2	
3	
4	
B	

- b. What if the market had 25 bags of apples to sell? How many apples is that in all?
- c. If a truck arrived that had some number, a , more apples on it, then how many bags would the clerks use to bag up the apples?
- d. If a truck arrived that had 600 more apples on it, how many bags would the clerks use to bag up the apples?
- e. How is part (d) different from part (b)?

Exercises

1. In New York State, there is a five-cent deposit on all carbonated beverage cans and bottles. When you return the empty can or bottle, you get the five cents back.
- a. Complete the table.

Number of Containers Returned	Refund in Dollars
1	
2	
3	
4	
10	
50	
100	
C	

- b. If we let C represent the number of cans, what is the expression that shows how much money is returned?
- c. Use the expression to find out how much money Brett would receive if he returned 222 cans.
- d. If Gavin needs to earn \$4.50 for returning cans, how many cans does he need to collect and return?
- e. How is part (d) different from part (c)?

2. The fare for a subway or a local bus ride is \$2.50.
- a. Complete the table.

Number of Rides	Cost of Rides in Dollars
1	
2	
3	
4	
5	
10	
30	
R	

- b. If we let R represent the number of rides, what is the expression that shows the cost of the rides?
- c. Use the expression to find out how much money 60 rides would cost.
- d. If a commuter spends \$175.00 on subway or bus rides, how many trips did the commuter take?
- e. How is part (d) different from part (c)?

Challenge Problem

3. A pendulum swings through a certain number of cycles in a given time. Owen made a pendulum that swings 12 times every 15 seconds.
- a. Construct a table showing the number of cycles through which a pendulum swings. Include data for up to one minute. Use the last row for C cycles, and write an expression for the time it takes for the pendulum to make C cycles.

- b. Owen and his pendulum team set their pendulum in motion and counted 16 cycles. What was the elapsed time?
- c. Write an expression for the number of cycles a pendulum swings in S seconds.
- d. In a different experiment, Owen and his pendulum team counted the cycles of the pendulum for 35 seconds. How many cycles did they count?

Problem Set

1. A radio station plays 12 songs each hour. They never stop for commercials, news, weather, or traffic reports.
 - a. Write an expression describing how many songs are played by the radio station in H hours.
 - b. How many songs will be played in an entire day (24 hours)?
 - c. How long does it take the radio station to play 60 consecutive songs?

2. A ski area has a high speed lift that can move 2,400 skiers to the top of the mountain each hour.
 - a. Write an expression describing how many skiers can be lifted in H hours.
 - b. How many skiers can be moved to the top of the mountain in 14 hours?
 - c. How long will it take to move 3,600 skiers to the top of the mountain?

3. Polly writes a magazine column, for which she earns \$35 per hour. Create a table of values that shows the relationship between the number of hours that Polly works, H , and the amount of money Polly earns in dollars, E .

- a. If you know how many hours Polly works, can you determine how much money she earned? Write the corresponding expression.
- b. Use your expression to determine how much Polly earned after working for $3\frac{1}{2}$ hours.
- c. If you know how much money Polly earned, can you determine how long she worked? Write the corresponding expression.
- d. Use your expression to determine how long Polly worked if she earned \$52.50.

4. Mitchell delivers newspapers after school, for which he earns \$0.09 per paper. Create a table of values that shows the relationship between the number of papers that Mitchell delivers, P , and the amount of money Mitchell earns in dollars, E .

- If you know how many papers Mitchell delivered, can you determine how much money he earned? Write the corresponding expression.
 - Use your expression to determine how much Mitchell earned by delivering 300 newspapers.
 - If you know how much money Mitchell earned, can you determine how many papers he delivered? Write the corresponding expression.
 - Use your expression to determine how many papers Mitchell delivered if he earned \$58.50 last week.
5. Randy is an art dealer who sells reproductions of famous paintings. Copies of the *Mona Lisa* sell for \$475.
- Last year Randy sold \$9,975 worth of *Mona Lisa* reproductions. How many did he sell?
 - If Randy wants to increase his sales to at least \$15,000 this year, how many copies will he need to sell (without changing the price per painting)?