

**UNIT**  
**2**

**Ratios and Proportional Relationships**

**Unit Test: C**

1. A shopper bought a 12-pound bag of oranges for \$18.75. What is the unit price per ounce?

- A \$0.098
- B \$0.64
- C \$1.56
- D \$9.76

2. Why does this table **not** show a proportional relationship?

<b>Time in Weeks (x)</b>	2	4	6	8
<b>Savings in Dollars (y)</b>	60	120	240	480

- A The ratio  $x : y$  equals  $1 : 30$ .
- B The ratio  $x : y$  is not constant.
- C The savings does not stay constant.
- D The savings is not increasing fast enough.

3. When you graph a proportional relationship  $y = kx$ , what does the constant of proportionality equal?

- A x-intercept
- C slope
- B y-intercept
- D none of these

4. Aki bought  $3\frac{3}{4}$  pounds of spinach for \$6.88. Using the unit rate, how much would  $1\frac{1}{2}$  pounds of spinach cost?

- A \$1.83
- B \$2.75
- C \$3.06
- D \$8.71

5. The population of a town doubled in 5 years, then doubled again in the next 10 years. What is the percent of increase?

- A 100%
- B 200%
- C 300%
- D 400%

6. The price of an item has increased 15% since last year. However, a person can buy the item for a 25% employee discount. The employee pays \$172.50. What was the price last year?

- A \$200
- B \$270.59
- C \$600
- D \$811.79

7. \$5,000 was invested at a simple interest rate. In 15 years, the account was worth 65 hundred dollars. What was the interest rate?

- A 0.2%
- C 2%
- B 1.5%
- D 2.15%

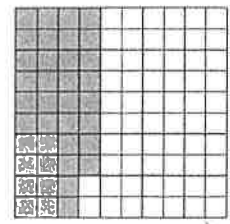
8. A quarter and dime make up what percent of a dollar?

- A 25%
- B 35%
- C 70%
- D 350%

9. When you find 215% of a number, how does your answer relate to the original number?

- A There is no relationship.
- B It is 215% less than the original number.
- C It is more than double the original number.
- D It is equal to the original number minus 215.

10. The relation of 38 squares to 100 squares can be expressed in many ways. Which of the following is **not** a way to express the relationship?



- A  $\frac{19}{50}$
- C 0.19
- B 38%
- D 0.38

**UNIT**  
**2**

**Ratios and Proportional Relationships**

11. A machine stamps 50 metal parts in 15 minutes 30 seconds. Find the unit rate in parts per hour.

193.55 p/h

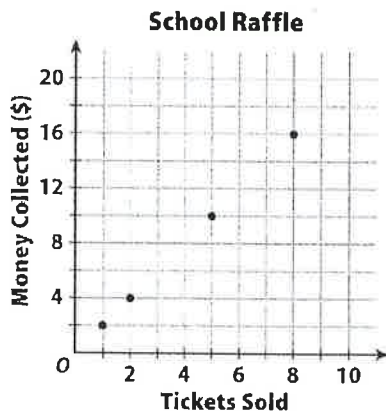
12. The table shows the distance traveled by two objects moving at constant speeds. Find their constants of proportionality. Which object is moving faster?

Time (s)	10	15	20
Object 1 (m)	85	127.5	170
Object 2 (m)	125	187.5	250

2nd obj is moving faster

$k=8.5; k=12.5$

13. The graph shows last year's raffle. This year the school increased prices by 50 cents per ticket. What equation represents this year's relationship?



$y = 2.5x$

14. In 1950, the population of a city was about 800,000 people. Over the next 50 years, the population increased to 1.3 million. Find the percent of increase.

62.5%

15. A business bought a lot of 2,500 lamps for fifty thousand dollars and wants to sell them at a 15% profit. How much should each lamp cost?

\$23

16. A store bought a sofa wholesale for \$200 and marked it up 15%. When the sofa didn't sell, they reduced the price 15%. Show why the current price is not \$200.

$200 \times 1.15 = 230 / 230 \times 0.85 = 195.5$

17. Karen is riding her bike at 4 miles per hour. She wants to show this on a graph. What should she draw?

A straight line through the origin & points (1,4) & (2,8)

18. What is the constant rate of change shown in the table?

Number of Batteries	Cost (\$)
1	1.19
2	2.38
3	3.57
8	9.52

\$1.19 per battery

19. How would you show a rate of change of 3.5 meters per minute on a graph? Name some of the points.

x-axis = minutes y-axis = meters  
Plot points (1, 3.5) (2, 7) (3, 10.5) etc.

20. A flagpole is 20 feet tall. Its shadow is 13 feet long. A boy is standing next to the flagpole. He is 5 feet 6 inches tall. How long is his shadow?

$3 \frac{23}{40}$  ft or 42.9 in or 3ft 6.9 in.

**MODULE**  
**4**

**Rates and Proportionality**

**Module Quiz: B**

1. A machine paints 340 toy boats in 45 minutes. Which expression equals the unit rate per hour?

- A  $\frac{3}{4}$                       C  $\frac{340}{3}$   
 B  $\frac{45}{340}$                     D  $\frac{340}{45}$

2. Which speed is the fastest?

- A 18 feet in 20 minutes  
 B 90 feet in 2.5 hours  
 C 20 yards in 1.5 hours  
 D  $3\frac{2}{3}$  yards in 15 minutes

3. What is the unit price for a piece of cheese if 1.24 pounds costs \$11.25?

- A \$0.11 per lb  
 B \$9.07 per lb  
 C \$12.49 per lb  
 D \$13.95 per lb

4. Which table shows a constant rate of change?

A

Days	6	12	18
Earnings (\$)	225	450	750

B

Days	6	12	18
Earnings (\$)	225	500	750

C

Days	6	12	20
Earnings (\$)	225	450	675

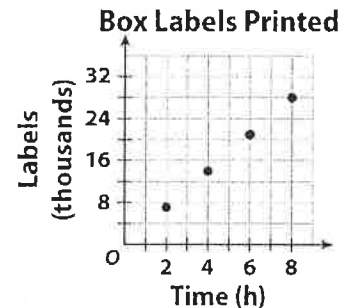
D

Days	6	12	20
Earnings (\$)	225	450	750

5. A student spends the same amount each week for bus fare. In 5 weeks, he spends \$115. Which equation shows this relationship? Let  $x$  = number of weeks.

- A  $y = 3.22x$   
 B  $y = 5x$   
 C  $y = 23x$   
 D  $y = 115x$

Use the graph for 6–7.



6. Draw a line through the points. Why does this line show a proportional relationship?

- A It is not curved.  
 B It is a vertical line.  
 C It connects all the dots.  
 D It goes through the origin.

7. What is the constant of proportionality for the relationship on the graph?

- A 3.5                      C 8  
 B 7                        D 28

8. If  $a$  is an integer, when is  $\frac{a}{b}$  always equal to an integer?

- A  $b = 0$                       C  $b > 1$   
 B  $b < 1$                       D  $b = 1$  or  $-1$

**MODULE 4** **Rates and Proportionality**

9. Complete the table for an object that goes  $\frac{3}{4}$  miles in 6 minutes.

Distance (mi)	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{4}$
Time (h)	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$

10. If a person bikes 2.4 miles in 10 minutes, how far can he bike in 1.5 hours?

21.6 mi

11. Explain how to simplify this complex fraction. Interpret the meaning of the result.

$$\frac{330 \text{ pages}}{\frac{3}{4} \text{ hour}}$$

Divide 330 by  $\frac{3}{4}$ ,  $330 \times \frac{4}{3} = 440$  which is the unit rate

12. Find  $k$ , the constant of proportionality, for the data in this table. Then write an equation for the relationship.

$x$	25	50	75	100
$y$	160	320	480	640

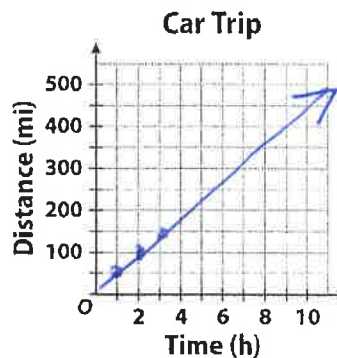
$k = 6.4$   $y = 6.4x$

13. Create a table that shows a proportional relationship. Do not use an integer for the constant of proportionality.

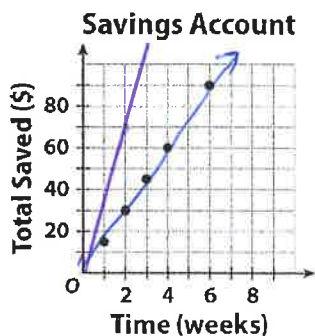
*Sample*

Number of Cookies	6	12	20
Cost (\$)	15	30	50

14. A car traveled at a constant speed of 45 miles per hour. Make a graph to show how the distance traveled in miles is related to the time in hours.



Use the graph for 15–16.



*Sample*

15. What equation shows the line through the data points on the graph?

$y = 15x$

16. Write an equation for someone saving more money per week. Add a line to the graph for this equation.

$y = 30x$

17. An object travels  $\frac{4}{5}$  miles in one-half hour. What is its speed?

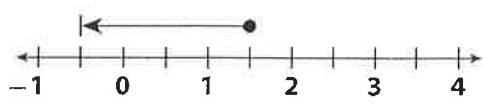
1.6 m/hr

**MODULE 5** **Proportions and Percent**  
**Module Quiz: B**

Use the table for 1–2.

Sales Tax in Cities	
River City	3%
Springfield	4.1%
Thompsonville	2.9%
Union City	3.2%

- Liz wants to buy a shirt for \$25. How much will Liz's shirt cost in Springfield rounded up to the nearest cent?  
 A \$25.50  
 B \$26.00  
 C \$26.03  
 D \$36.66
- How much more will her shirt cost in Union City than in River City?  
 A \$0.01  
 B \$0.05  
 C \$0.10  
 D \$25.80
- A town's population went from 25,800 to 42,600 in 15 years. What was the percent of change?  
 A 35%  
 B 39.4%  
 C 61%  
 D 65.1%
- A gym's membership in 2010 was 8,700. Now, it is 6,400. Which expression equals the percent of change?  
 A  $6,400 \div 8,700$   
 B  $8,700 - 6,400$   
 C  $(8,700 - 6,400) \div 8,700$   
 D  $(8,700 - 6,400) \div 6,400$

- A store marks up sporting goods 27%. Which expression equals the retail price of an item with an original cost of  $p$  dollars?  
 A  $p \times 0.27$   
 B  $p \div 0.27$   
 C  $p \times 0.73$   
 D  $p \times 1.27$
- A toy store marks down every toy by 15% in January. How much does a toy cost during January? Use  $p$  for the price in December.  
 A  $0.15p$   
 B  $0.75p$   
 C  $0.85p$   
 D  $1.15p$
- A market buys mixed nuts at \$12.50 per pound. They want to make a 22% profit. What should they charge for the retail price?  
 A \$2.75/lb  
 B \$9.75/lb  
 C \$15.25/lb  
 D \$34.50/lb
- A student spends \$48 on school supplies at a store where the sales tax is 7%. What is the total cost of the supplies?  
 A \$3.36  
 B \$33.60  
 C \$51.36  
 D \$55.00
- What is the annual interest for a principal of \$3,500 at a simple annual interest rate of 2.3%?  
 A \$80.50  
 B \$805.00  
 C \$3,580.50  
 D \$4,305.00
- Which expression does this number line show?  


- A  $-0.5 - 1.5$   
 B  $1.5 - (-0.5)$   
 C  $1.5 - 2$   
 D  $1.5 + 2$

**MODULE**  
**5**

**Proportions and Percent**

11. What is one way to find the total cost of a jacket for \$55.80 with a sales tax of 2.7%?

Sample answer Find 2.7% of \$55.80 and add the result to \$55.80

12. What is another way to find the total cost of a jacket for \$55.80 with a sales tax of 2.7%?

Sample answer Mult \$55.80 by 1.027

13. The price of a \$250 coat increased 7% last year. The coat is now on sale for one-half off. What is the sale price?

\$ 133.75

Use the table for 14–15.

Population Changes

Town	2000	2010
Lakeside	51,342	45,863
Centerville	37,065	26,102
Riverview	41,726	63,017

14. Find the percent of change to the nearest tenth of a percent for Centerville.

29.6% decrease

15. Which town had the greatest percent of change? What was the percent?

Riverview with an increase of 51%

16. A clerk is marking up merchandise 34%. The original price of an item is \$455. What will be the retail price?

\$ 609.70

17. At the end of the summer, a store marks down all the outdoor furniture 18%. A family bought 4 chairs in June at \$35 each, then 2 more chairs when they went on sale. How much did all 6 chairs cost?

\$ 197.40

18. A shopper paid \$51.93 including tax for an item marked \$48.99. What would she pay for another item marked \$75?

\$ 79.50

19. An amount of \$8,000 is invested at a simple interest rate of 1.5%. What is the total amount after 3 years?

\$ 8,360

20. A restaurant bill before tax is \$15.50. If the sales tax is 8% and a 15% tip is added, what is the total cost of the meal?

\$ 19.07

21. Find  $k$ , the constant of proportionality, for the data in this table. Then write an equation for the relationship.

$x$	10	15	20	25
$y$	65	97.5	130	162.5

$k = 6.5$   $y = 6.5x$