

NAME _____

DATE _____

Module Test A Module 16

Solve.

1. $\frac{25}{b} = 50$ $b = \frac{1}{2}$ _____

2. $\frac{x}{2} = \frac{4}{7}$ $x = \frac{8}{7}$ _____

3. $\frac{z}{2} - \frac{3}{2} = \frac{z}{3}$ $z = 9$ _____

4. $\frac{3}{x} + \frac{2}{3} = \frac{4}{x}$ $x = \frac{3}{2}$ _____

5. $\frac{x+7}{x+6} - \frac{1}{2} = 0$ $x = -8$ _____

6. $\frac{2}{3x} + 4 = \frac{1}{3x}$ $x = -\frac{1}{12}$ _____

7. $\frac{1}{2} - \frac{3}{2b} = \frac{4}{b}$ $b = 11$ _____

8. $\frac{3}{x-2} + 1 = \frac{12}{x-2}$ $x = 11$ _____

For questions 9–11, circle the letter of the correct answer.

9. What statement describes the function shown in the table?

- a. The function shows a direct variation.
- b. The function shows an inverse variation.
- c. The function shows neither a direct nor an inverse variation.

x	y
15	5
120	40
300	100

10. What statement describes the function shown in the table?

- a. The function shows a direct variation.
- b. The function shows an inverse variation.
- c. The function shows neither a direct nor an inverse variation.

x	y
-2	-5
10	-1
20	0.5

11. What statement describes the function shown in the table?

- a. The function shows a direct variation.
- b. The function shows an inverse variation.
- c. The function shows neither a direct nor an inverse variation.

x	y
2	40
4	20
16	5

True or False.

12. The length of a given spring varies directly as the amount of force applied to the spring.

- a. If 20 pounds per square inch of force stretches a spring 10 inches, a 24 pounds per square inch force is needed to stretch the same spring 12 inches.
- b. If a spring is stretched 4.5 inches by a force of 10 pounds per square inch, a force of 25 pounds per square inch is needed to stretch the same spring 13 inches.

true _____

false _____

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13. The frequency of a vibrating string varies inversely as the length of the string.
- a. If a 25-inch string has a frequency of 500 Hertz, a 62.5-inch string is needed to produce a frequency of 200 Hertz.
- b. If a frequency of 440 Hertz is produced by a 18-inch string, a 12-inch string is needed to produce a pitch of 660 Hertz?

truetrue**Solve.**

14. The ordered pair (5, 20) appears in a function in which y varies inversely as x.

Write the inverse variation function. $xy = 100$

15. The variable y varies directly as x: y is 3 when x is 12. Find x when y is 5.

 $x = 20$

16. The variable y varies inversely as x: y is 8 when x is -4. Find y when x is 2.

 $y = -16$

17. Winchester's snow plow can clear the streets in the town's center in 8 hours. A neighboring town has a new plow that can clear the same area in 4 hours. If both snow plows are used simultaneously, how long will it take to clear the streets?

- a. Organize the given information into a chart.

	Work Rate	Time Worked	Work Done
Winchester	$\frac{1}{8}$	t	$\frac{t}{8}$
Neighboring Town	$\frac{1}{4}$	t	$\frac{t}{4}$

- b. Write an equation that can be used to solve the problem.

$\frac{t}{8} + \frac{t}{4} = 1$

- c. Solve the equation.

$$\frac{t}{8} + \frac{t}{4} = 1$$

$$8 \cdot \frac{t}{8} + 8 \cdot \frac{t}{4} = 8 \cdot 1$$

$$t + 2t = 8$$

$$3t = 8$$

$$t = \frac{8}{3} \text{ or } 2\frac{2}{3}$$

Together, the two snow plows can clear the streets in $2\frac{2}{3}$ hours or 2 hours 40 minutes.

18. A car and a bus left Central Station at the same time, and they traveled the same route. The rate of the car was 20 miles per hour faster than the rate of the bus. In the same time, the car traveled 130 miles and the bus traveled 90 miles. What was the rate of the bus? Show all work.

$$\frac{90}{r} = \frac{130}{r + 20}$$

$$90(r + 20) = 130r$$

$$90r + 1,800 = 130r$$

$$1,800 = 40r$$

$$45 = r$$

The rate of the bus was 45 miles per hour.

19. When can cross-multiplication be used to solve a rational equation? Give an example of a rational equation that can be solved using cross-multiplication.

Cross-multiplication can be used when the equation contains a single fraction on each side of the equal sign. For example, the equation $\frac{5}{x} = \frac{2}{25}$ can be solved using cross-multiplication.

20. State regulations require that there must be one adult present for every five students on a field trip. If x represents the number of students, and y represents the number of adults, write an equation to represent the situation. Is the functional relationship between x and y a direct variation or an inverse variation function? Explain.

This may be represented by the function $\frac{y}{x} = \frac{1}{5}$. The function represents a direct variation. For each ordered pair (number of students, number of teachers), the ratio of y to x is $\frac{1}{5}$.

