LESSON 2.6

Solving Equations Using Multiplication *or* Division

Review Vocabulary

solving an equation, p. 86

inverse operations,

BEFORE *Now* **WHY?**

You solved addition and subtraction equations.

You'll solve equations using multiplication or division.

So you can find how long it takes whales to migrate, as in Ex. 35.

$$T = LDL + HDL + \frac{Tr}{5}$$

$$190 = X + 45 + \frac{125}{5}$$

$$190 = X + 45 + 25$$

$$-70 \quad 190 = X + 70 - 70$$

$$120 = X$$

$$x + 4 = 16$$

$x2 + 4 = 16$

$x = x2$

$x + 4 = 16$

$+ -4 \quad + -4$

$x = 12$

$\cdot 4 \quad x + 4 = 16 \div 4$

$x = 12$

13

14

$x + 4 = 16$ -4 $x + 4 = 16 - 4 = x = 12$

Division Property of Equality

Words Dividing each side of an equation by the same nonzero number produces an equivalent equation.

Numbers If $3x = 12$, then $\frac{3x}{3} = \frac{12}{3}$, or $x = 4$.

Algebra If $ax = b$ and $a \neq 0$, then $\frac{ax}{a} = \frac{b}{a}$, or $x = \frac{b}{a}$.

Multiplication Property To solve an equation that involves division, you can use the *multiplication property of equality.*

Multiplication Property of Equality

Words Multiplying each side of an equation by the same nonzero number produces an equivalent equation.

Numbers If $\frac{x}{3} = 12$, then $3 \cdot \frac{x}{3} = 3 \cdot 12$, or $x = 36$.

Algebra If $\frac{x}{a} = b$ and $a \neq 0$, then $a \cdot \frac{x}{a} = a \cdot b$, or $x = ab$.

Last week $x + 3 = 12$ -3 -3

$x = 9$

this $\frac{1}{4} \cdot 4x = 44 \cdot \frac{1}{4}$

$x = 11$

LESSON 2.6

Name _____ Date _____

Practice A

For use with pages 96–101

1. Describe and correct the error in the solution.

$$-5k = 75$$

$$\frac{-5k}{5} = \frac{75}{5}$$

$$k = 15$$

Solve the equation. Check your solution.

2. $3a = 21$ **3.** $4y = 44$ **4.** $-32 = 16d$

$\frac{1}{4} \cdot \frac{4}{1} y = \frac{44}{1} \cdot \frac{1}{4}$

$y = 11$

5. $-120 = 15b$ **6.** $-80 = -20g$ **7.** $155 = -31m$

$\frac{1}{-20} \cdot -80 = -20g \cdot \frac{1}{-20}$

$4 = g$

8. $\frac{f}{7} = 8$

9. $\frac{n}{11} = 6$

10. $\frac{c}{12} = -9$

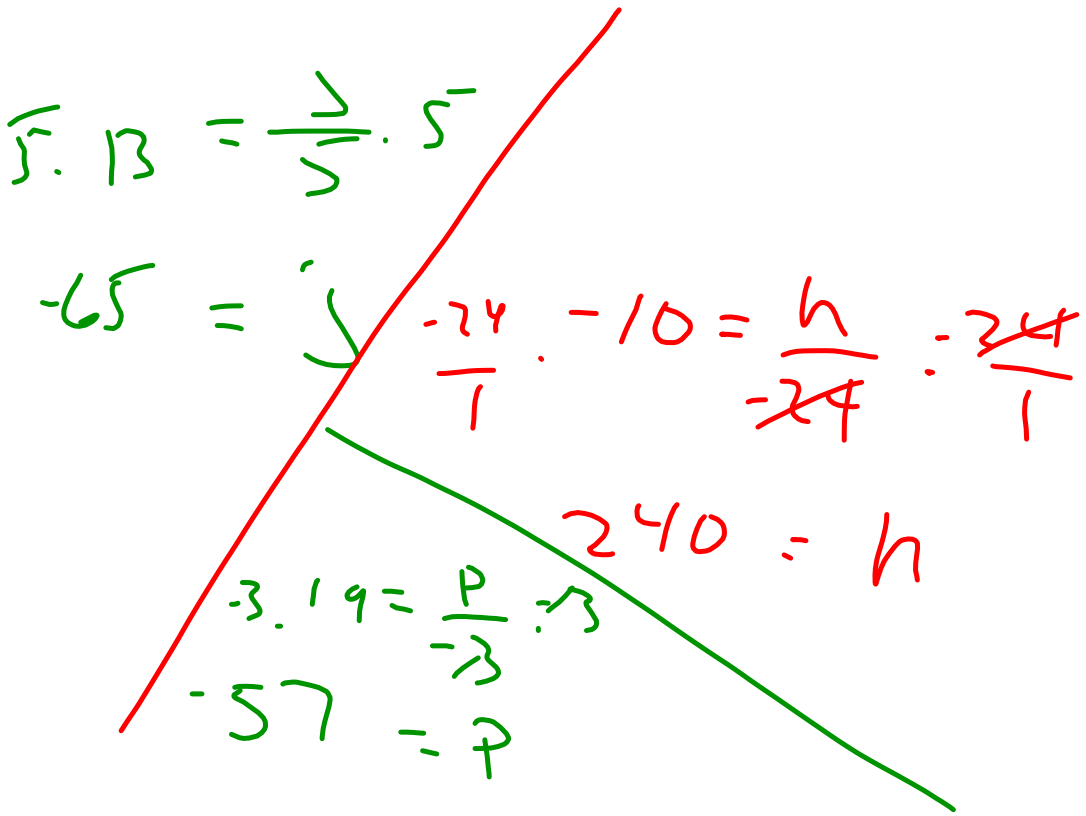
$11 \cdot \frac{n}{11} = 6 \cdot 11$

$n = 66$

11. $-13 = \frac{j}{5}$

12. $-10 = \frac{h}{-24}$

13. $19 = \frac{p}{-3}$



14. $8c + 2c = -70$

15. $4(-4p) = 64$

16. $\frac{z}{3} = -5 + 11$

17. During the last basketball season, Tanisha played in 16 games and averaged 18 points per game. Find her total points by using the verbal model below to write and solve an equation.

$$\boxed{\text{Average points per game}} = \frac{\boxed{\text{Total points}}}{\boxed{\text{Number of games played}}}$$

$$16 \cdot 18 = \frac{x}{16} \cdot 16$$

$$288 = x$$

18. A printer prints documents at a rate of 12 pages per minute. A copier copies documents at a rate of 10 pages per minute.

a. Write and solve an equation to find the time it takes to print a 24-page research paper.

b. Write and solve an equation to find the time it takes to copy a 50-page document.

A)

$\frac{1}{12} \cdot 24 = 12x \cdot \frac{1}{12}$

$2 = x$

B) $\frac{1}{10} \cdot 50 = 10x \cdot \frac{1}{10}$

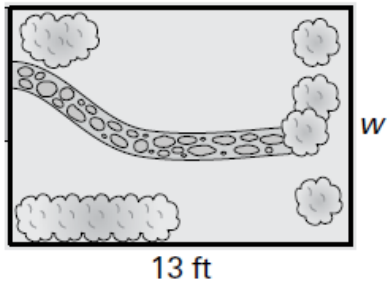
$5 = x$

19. A car travels at a constant rate of 45 miles per hour. Find the amount of time it takes the car to travel 180 miles.

$\frac{1}{45} 45x = 180 \cdot \frac{1}{45}$

$x = 4$

20. The area of the fenced-in yard is 117 square feet. The length of the yard is 13 feet. Find the width of the yard.



$\frac{1}{13}13w = 117 \cdot \frac{1}{13}$

$w = 9$