2.1 Algebra 2

Solving Linear Equations and Word Problems

EXAMPLE 1 **Solve an equation with a variable on one side**

Solve $\frac{4}{5}x + 8 = 20$.

$-8 \quad -8$

$\frac{5}{4} \cdot \frac{4}{5}x = 12 \cdot \frac{5}{4}$

$x = 15$

EXAMPLE 2 Write and use a linear equation

RESTAURANT During one shift, a waiter earns wages of $30 and gets an additional 15% in tips on customers' food bills. The waiter earns $105. What is the total of the customers' food bills?

x

$30 + .15x = 105$

$-30 \quad -30$

$\frac{.15x}{.15} = \frac{75}{.15}$

$x = \$500$

EXAMPLE 4 Solve an equation using the distributive property

Solve $3(5x - 8) = -2(-x + 7) - 12x$.

$15x - 24 = 2x - 14 - 12x$

$-15x \quad\quad -15x$

$-24 = -13x - 14 - 12x$

$-24 \quad\quad +12x$

$+14 \quad = -25x - 14$

$\quad\quad\quad +14$

$+10 = -25x$

$+25 \quad -25$

$\frac{2}{5} = x$

What is the value of x in the equation below?

$2(10x + 8) - 1 = 5(x - 6)$

A) $x = -3$

B) $x = -\frac{13}{15}$

C) $x = \frac{3}{5}$

D) $x = 3$

$20x + 16 - 1 = 5x - 30$

$20x + 15 = 5x - 30$

$-5x \quad -15 \quad -5x \quad -15$

$\frac{15x}{15} = \frac{-45}{15}$

$x = -3$

GUIDED PRACTICE for Examples 3, 4, and 5

Solve the equation. Check your solution.

5. $-2x + 9 = 2x - 7$ $x = 4$

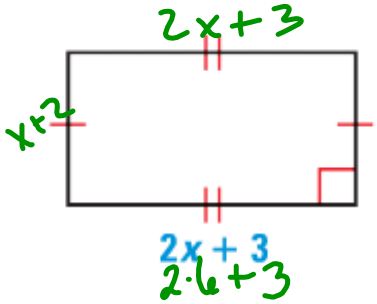
6. $10 - x = -6x + 15$ $x = 1$

7. $3(x + 2) = 5(x + 4)$

8. $-4(2x + 5) = 2(-x - 9) - 4x$

GEOMETRY Solve for x. Then find the length of each side of the figure.

Perimeter = 46



$x+2+2x+3+x+2+2x+3=46$

$6x+10=46$

$-10 \quad -10$

$6x=36$

$x=6$

8 by 15

Homework

Worksheet

Section 2.1
Solving Linear Equations and Word Problems Practice

Name:_____

VARIABLE ON BOTH SIDES **Solve the equation. Check your solution.**

1. $4n - 7 = 5 - 2n$

2. $5m - 2 = -m - 2$

3. $6 - 5q = q + 9$

4. $5d + 17 = 4(d + 3)$

5. $-4(n + 2) = 3(n - 4)$

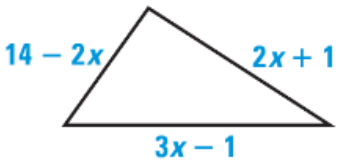
6. $3(2x - 5) - x = -7(x + 3)$

7. $7(t - 3) = 2(t - 9) + 2t$

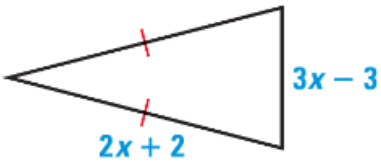
8. $\frac{1}{5}d + \frac{1}{8}d = 2$

GEOMETRY Solve for x. Then find the length of each side of the figure.

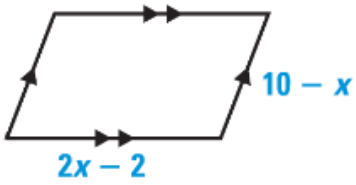
9. Perimeter = 26



10. Perimeter = 15



11. Perimeter = 26



12. **CATALOG PURCHASE** You are ordering T-shirts from a catalog. Each T-shirt costs \$15. The cost of shipping is \$6 no matter how many you order. The total cost is \$111. How many T-shirts did you order?

13. **CAR SALES** A salesperson at a car dealership has a base salary of \$25,000 per year and earns a 5% commission on total sales. How much must the salesperson sell to earn \$50,000 in one year?