

Unit 2 Study Guide – Solving Equations

Solve.

Name Key

$$1. -9 = -8 + x$$

$$\begin{array}{r} +8 \\ +8 \end{array}$$

$$\boxed{x = -1}$$

$$2. x + 2 = -11$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

$$\boxed{x = -13}$$

$$3. \frac{x}{2} = -19 \cdot 2$$

$$\boxed{x = -38}$$

$$4. -x - (-5) = 9$$

$$\begin{array}{r} -x + 5 = 9 \\ -5 \quad -5 \end{array}$$

$$\begin{array}{r} x = 4 \\ -4 \quad -4 \end{array}$$

$$\boxed{x = -4}$$

$$5. |-9| + x = 12$$

$$\begin{array}{r} 9 + x = 12 \\ -9 \quad -9 \end{array}$$

$$\boxed{x = 3}$$

$$6. 1 = -(-3x + 8)$$

$$\begin{array}{r} 1 = 3x - 8 \\ +8 \quad +8 \end{array}$$

$$\begin{array}{r} 9 = 3x \\ \frac{9}{3} \quad \frac{3x}{3} \end{array}$$

$$\boxed{x = 3}$$

$$7. 2x + 7 = 4x + 8$$

$$\begin{array}{r} -2x \quad -2x \\ 7 = 2x + 8 \\ -8 \quad -8 \end{array}$$

$$\begin{array}{r} -1 = 2x \\ \frac{-1}{2} \quad \frac{2x}{2} \end{array}$$

$$\boxed{x = -\frac{1}{2}}$$

$$8. -4x = -2x + 30$$

$$\begin{array}{r} +2x \quad +2x \end{array}$$

$$\begin{array}{r} -2x = 30 \\ \frac{-2x}{-2} \quad \frac{30}{-2} \end{array}$$

$$\boxed{x = -15}$$

$$9. 8 - 4x = 16$$

$$\begin{array}{r} -8 \quad -8 \\ -4x = 8 \\ \frac{-4x}{-4} \quad \frac{8}{-4} \end{array}$$

$$\boxed{x = -2}$$

$$10. 3(x - 3) = 9$$

$$3x - 9 = 9$$

$$\begin{array}{r} +9 \quad +9 \end{array}$$

$$\begin{array}{r} 3x = 18 \\ \frac{3x}{3} \quad \frac{18}{3} \end{array}$$

$$\boxed{x = 6}$$

$$11. -2x - 15 = 7x + 12$$

$$\begin{array}{r} +2x \quad +2x \end{array}$$

$$\begin{array}{r} -15 = 9x + 12 \\ -12 \quad -12 \end{array}$$

$$\begin{array}{r} -27 = 9x \\ \frac{-27}{9} \quad \frac{9x}{9} \end{array}$$

$$\boxed{x = -3}$$

$$12. \frac{1}{5}x = -12 \cdot 5$$

$$\boxed{x = 60}$$

$$13. 48 = 4 + 11x$$

$$\begin{array}{r} -4 \quad -4 \end{array}$$

$$\begin{array}{r} 44 = 11x \\ \frac{44}{11} \quad \frac{11x}{11} \end{array}$$

$$\boxed{x = 4}$$

$$14. 72 = 2x + 6x$$

$$\begin{array}{r} 72 = 8x \\ \frac{72}{8} \quad \frac{8x}{8} \end{array}$$

$$\boxed{x = 9}$$

$$15. \frac{1}{3}(x + 9) = 1 \cdot 3$$

$$\begin{array}{r} x + 9 = 3 \\ -9 \quad -9 \end{array}$$

$$\boxed{x = -6}$$

$$-|-2| + x = -14$$

$$\begin{array}{r} -2 + x = -14 \\ +2 \quad +2 \end{array}$$

$$\boxed{x = -12}$$

$$17. 3(3x-1) = \frac{3}{5}(-5+15x)$$

$$9x-3 = -3+9x$$

$$\boxed{10}$$

$$18. -3 - (-5x) = -x + 9$$

$$\begin{array}{r} -3 + 5x = -x + 9 \\ +x \quad +x \end{array}$$

$$\begin{array}{r} -3 + 6x = 9 \\ +3 \quad +3 \end{array}$$

$$6x = \frac{12}{6}$$

$$\boxed{x = 2}$$

$$19. 10x - 9 = 10x$$

$$\begin{array}{r} -10x \quad -10x \\ -9 = 0 \end{array}$$

$$\boxed{NS}$$

$$20. -(15+x) = 2(15-2x) + 8x$$

$$-15 - x = 30 - 4x + 8x$$

$$\begin{array}{r} -15 - x = 30 + 4x \\ +x \quad +x \end{array}$$

$$-15 = 30 + 5x$$

$$\begin{array}{r} -30 \quad -30 \\ -45 = 5x \end{array}$$

$$\begin{array}{r} -45 = 5x \\ \frac{-45}{5} = \frac{5x}{5} \end{array}$$

$$\boxed{x = -9}$$

$$21. \frac{1}{2}(2x-6) = 2x$$

$$\begin{array}{r} x - 3 = 2x \\ -x \quad -x \end{array}$$

$$\boxed{x = -3}$$

22. Your school band needs to buy new percussion equipment. The equipment will cost \$2000. You have collected \$800 in previous fundraisers. If you sell sandwiches at \$4 each, how many sandwiches will you need to sell to raise the remaining funds?

$$\begin{array}{r} 800 + 4x = 2000 \\ -800 \quad -800 \end{array}$$

$$\begin{array}{r} 4x = 1200 \\ \frac{4x}{4} = \frac{1200}{4} \end{array}$$

$$x = 300$$

You will need
300 sandwiches

23. As a lifeguard, you earn \$6 per day plus \$2.50 per hour. Write and solve an equation to find how many hours you must work to earn \$16 in one day.

$$\begin{array}{r} 6 + 2.50h = 16 \\ -6 \quad -6 \end{array}$$

$$\begin{array}{r} 2.50h = 10 \\ \frac{2.50h}{2.50} = \frac{10}{2.50} \end{array}$$

$$\boxed{h = 4 \text{ hours}}$$

24. Solve for the indicated variable.

a.) $V = \frac{lw}{h}$ for w

$$w = \frac{V}{lh}$$

b.) $S = 2B + Ph$ for B

$$\frac{S - Ph}{2} = \frac{2B}{2}$$

$$B = \frac{S - Ph}{2}$$

25. Find and explain the error in the following problem. Then correctly solve the equation.

$$12x + 60 = x + 5x + 20 - 2x$$

$$12x + 60 = 4x + 20$$

$$8x + 60 = 20$$

$$8x = -40$$

$$x = -5$$

$$12x + 60 = x + 5(x + 4) - 2x$$

$$12x + 60 = x + 5x + 4 - 2x$$

$$12x + 60 = 4x + 4$$

$$16x + 60 = 4$$

$$16x = -56$$

$$x = -\frac{7}{2}$$

Did not distribute 5 to the 4.

Should have subtracted $4x$ instead of adding $4x$.

Solve.

26. $|x| = 4$

$$x = 4, -4$$

$$\{-4, 4\}$$

27. $|-7 - 5r| = 23$

$$-7 - 5r = 23$$

$$-5r = 30$$

$$r = -6$$

$$|-7 - 5(-6)| = 23$$

$$|-7 + 30| = 23$$

$$|23| = 23 \checkmark$$

$$-7 - 5r = -23$$

$$-5r = -16$$

$$r = \frac{16}{5}$$

$$|-7 - 5(\frac{16}{5})| = 23$$

$$|-7 - 16| = 23$$

$$|-23| = 23 \checkmark$$

$$\{-6, \frac{16}{5}\}$$

28. $8|-9 + 6r| = \frac{72}{8}$

$$|-9 + 6r| = 9$$

$$-9 + 6r = 9$$

$$6r = 18$$

$$r = 3$$

$$|-9 + 6(3)| = 9$$

$$|-9 + 18| = 9$$

$$|9| = 9 \checkmark$$

$$-9 + 6r = -9$$

$$6r = 0$$

$$r = 0$$

$$|-9 + 6(0)| = 9$$

$$|-9 + 0| = 9$$

$$|-9| = 9 \checkmark$$

$$\{0, 3\}$$

Vocabulary Matching.

H Equation

I Proportion

A Coefficient

C Ratio

F Literal Equation

B Rate

E Reciprocal

J Solution

L Like Terms

~~A.~~ The numerical factor of a term.

~~B.~~ The comparison of two measurements having different units of measure.

~~C.~~ A comparison of two numbers by division.

D. A set of ordered pairs.

~~E.~~ The multiplicative inverse of a number.

~~F.~~ A formula or equation with several variables.

G. An equation that states a rule for the relationship between certain quantities.

~~H.~~ A mathematical sentence containing an equal sign.

~~I.~~ An equation stating that two fractions are equivalent.

~~J.~~ A replacement value for a variable that makes an open sentence true.

K. A relation in which each element of the domain is paired with exactly one element of the range.

~~L.~~ Terms that contain the same variables, with corresponding variables having the same exponent.

M. Integers that follow each other.