Name _____ Date _____ Class _____

SKILL 18: Solving Equations with Rational Numbers

You can use the same procedures to solve equations with rational numbers that you used to solve equations with integers. You "undo" operations so that the variable is alone on one side of the equation.

Example 1

Solve: $\frac{2}{3}x = -\frac{1}{4}$.

$\frac{2}{3}x = \frac{-1}{4}$ Rewrite $-\frac{1}{4}$ as $\frac{-1}{4}$.

$\frac{2}{3}x \div \frac{2}{3} = \frac{-1}{4} \div \frac{2}{3}$ Undo multiplication by division. Divide both sides by $\frac{2}{3}$.

$x = \frac{-1}{4} \cdot \frac{3}{2}$ Change division by a fraction to multiplication by its reciprocal.

$= \frac{-1 \cdot 3}{4 \cdot 2}$ Multiply numerators. Multiply denominators.

$x = \frac{-3}{8}$

The solution is $-\frac{3}{8}$.

Example 2

Solve: $\frac{x}{-0.4} = 6$.

$\frac{x}{-0.4} = 6$ x is divided by -0.4.

$\frac{x}{-0.4} \cdot (-0.4) = 6 \cdot (-0.4)$ Undo division by multiplication. Multiply both sides by -0.4.

$x = -2.4$

The solution is -2.4.

Guided Practice

Solve each equation. Check your solution.

1. $m - 5 = -\frac{1}{2}$

5 is _____ from m.
(added/subtracted)

Undo this operation by _____.
(addition/subtraction)

$m - 5 +$ _____ $= -\frac{1}{2} +$ _____

$x =$ _____

2. $-0.6x = -6$

x is multiplied by _____.

Undo multiplication by _____.

$\frac{-0.6x}{-0.6} = \frac{-6}{-0.6}$

$x =$ _____

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SKILL 18: Practice

Solve each equation. Check your solution.

1. $x + \frac{5}{7} = \frac{6}{7}$

   $x =$ _____

2. $x - \frac{1}{8} = -\frac{5}{8}$

   $x =$ _____

3. $6m = -\frac{1}{2}$

   $m =$ _____

4. $k + 4\frac{1}{2} = 3\frac{1}{2}$

   $k =$ _____

5. $\frac{n}{-4} = \frac{1}{2}$

   $n =$ _____

6. $y - \frac{5}{8} = -\frac{3}{8}$

   $y =$ _____

7. $-3y = \frac{5}{8}$

   $y =$ _____

8. $10x = -7$

   $x =$ _____

9. $m + 9 = -11$

   $m =$ _____

10. $t + \left(-1\frac{1}{2}\right) = -6\frac{1}{2}$

    $t =$ _____

11. $j - \left(-4\frac{1}{3}\right) = -10$

    $j =$ _____

12. $2k = \frac{1}{8}$

    $k =$ _____

13. $x - 3.2 = -20.8$

    $x =$ _____

14. $-0.25x = 2$

    $x =$ _____

15. $\frac{5}{16}n = -10$

    $n =$ _____

16. $-\frac{4}{5}m = 6$

    $m =$ _____

17. $\frac{8}{9}t = -\frac{1}{3}$

    $t =$ _____

18. $y + 1\frac{1}{4} = 7\frac{1}{4}$

    $y =$ _____

19. $-\frac{1}{4}j = \frac{2}{3}$

    $j =$ _____

20. $-0.01k = 0.8$

    $k =$ _____

21. $-6t = 6.6$

    $t =$ _____

Solve.

22. The price of a share of stock changed by −$19.20 over a 5-day period. What was the average daily change in the price of a share of the stock? _____

23. Janice plans to save $22.50 each week until she has enough money to buy a $180 bicycle. After how many weeks will she have enough money for the bicycle? _____

TEST PREP

24. Solve $2x = -8.4$. *Skill 18*

    A −16.8 **C** 4.2

    B −4.2 **D** −42

25. Multiply: $-\frac{3}{4} \cdot \left(-\frac{2}{3}\right)$. *Skill 17*

    F $\frac{1}{2}$ **H** $-\frac{1}{2}$

    G $-\frac{5}{12}$ **J** $1\frac{1}{8}$