NAME _____ DATE _____ PERIOD _____

3-8 Solving Equations and Formulas

(Pages 166–170)

Some equations contain more than one variable. To solve an equation or formula for a specific variable, you need to get that variable by itself on one side of the equation. When you divide by a variable in an equation, remember that division by 0 is undefined.

When you use a formula, you may need to use **dimensional analysis**, which is the process of carrying units throughout a computation.

Examples

a. Solve the formula $d = rt$ for t.

The variable t has been multiplied by r, so divide each side by r to isolate t.

$\frac{d}{r} = \frac{rt}{t}$ or $\frac{d}{r} = t$

Thus $t = \frac{d}{r}$, *where* $r \neq 0$.

b. Find the time it takes to drive 75 miles at an average rate of 35 miles per hour.

Use the formula you found for t in Example A.

$t = \frac{d}{r}$

$t = \frac{75 \text{ mi}}{35 \frac{\text{mi}}{\text{h}}}$ *Use dimensional analysis.* $\frac{\frac{\text{mi}}{\text{h}}}{\frac{\text{mi}}{\text{h}}} = \frac{\text{mi}}{1} \cdot \frac{\text{h}}{\text{mi}} = \text{h}$

$t = 2\frac{1}{7}$ *hours*

Try These Together

1. Solve $4a + b = 3a$ for a.

HINT: Begin by subtracting 3a from each side.

2. Solve $\frac{c + d}{3} = 2c$ for c.

HINT: Begin by multiplying each side by 3.

Practice

Solve each equation for the variable specified.

3. $f = epd$, for e

4. $12g + 31h = -8g$, for h

5. $y = mx + b$, for b

6. $v = r + at$, for r

7. $\frac{3x + y}{c} = 4$, for c

8. $\frac{5xy + n}{2} = -6$, for y

9. $m + n + 2p = 3$, for m

10. $6y + z = bc - 2y$, for y

11. $3x - 4y = 7$, for y

12. $s = \frac{n}{2}(a + t)$, for n

13. $v = \frac{4}{3}r$, for r

14. $W = mgh$, for g

15. $PV = nRT$, for V

16. $G = F - D$, for D

17. $6t + 62s = \frac{1}{2}(3t - 42s)$, for t

18. $3c + 5d = 7d - 6c$, for d

19. **Standardized Test Practice** Four ninths of a number c increased by 4 is 18 less than one eighth times another number d. Solve for c.

A $c = \frac{9}{32}d + 31\frac{1}{2}$ **B** $c = \frac{4}{72}d + \frac{4}{72}$ **C** $c = \frac{9}{32}d - 49\frac{1}{2}$ **D** $c = \frac{4}{72}d - 31\frac{1}{2}$

Answers: **1.** $a = -b$ **2.** $c = \frac{d}{5}$ **3.** $e = \frac{f}{pd}$ **4.** $h = \frac{-20g}{31}$ **5.** $b = y - mx$ **6.** $r = v - at$ **7.** $c = \frac{3x + y}{4}$ **8.** $y = \frac{-n - 12}{5x}$ **9.** $m = 3 - n - 2p$ **10.** $y = \frac{bc - z}{8}$ **11.** $y = \frac{3x - 7}{4}$ **12.** $n = \frac{2s}{a + t}$ **13.** $r = \frac{3}{4}v$ **14.** $g = \frac{W}{mh}$ **15.** $V = \frac{nRT}{P}$ **16.** $D = F - G$ **17.** $t = -\frac{16s}{9}$ **18.** $d = \frac{9c}{2}$ **19.** C