Using the Distributive Property to Solve Equations

Recall the Distributive Property…

$$a(b + c) = ab + ac$$

If an equation has parentheses, eliminate the parentheses using the **distributive property**. Finish solving using the techniques you learned earlier.

Example One

Solve: $2(6x + 4) = 68$ Eliminate the parentheses
                          Distribute the 2 to the terms inside the parentheses

$12x + 8 = 68$

$\underline{\quad -8 \quad -8\quad}$ Subtract 8 from each side of the equation

$12x = 60$

$\dfrac{12x}{12} = \dfrac{60}{12}$ Divide both sides of the equation by 12

$x = 5$

Example Two

Solve: $9n - 3(2n - 5) = 45$ Eliminate the parentheses
                          Distribute the -3 to the terms inside the parentheses

$9n - 6n + 15 = 45$

$3n + 15 = 45$ Combine like terms

$\underline{\quad -15 \quad -15\quad}$ Subtract 15 from each side of the equation

$3n = 30$

$\dfrac{3n}{3} = \dfrac{30}{3}$ Divide both sides of the equation by 3

$n = 10$

Example Three

Solve: $-2(3a - 1) = 4(2a + 4)$ Eliminate parentheses

$-6a + 2 = 8a + 16$ Use the distributive property

$\underline{+6a \qquad\quad + 6a\quad}$ Add $6a$ to each side of the equation

$2 = 14a + 16$

$\underline{-16 \qquad\quad - 16\quad}$ Subtract 16 from each side of the equation

$-14 = 14a$

$\dfrac{-14}{14} = \dfrac{14a}{14}$ Divide both sides of the equation by 14

$-1 = a$

$a = -1$

WORLD'S MOST EXPENSIVE COLLEGE

−10	15		−2		−3	−4	−3½
−20		4⅓	−9				
14			−7½	12	5		2½
	−8			18	−14		
1				13		
	2⅔		−28½			7	
11	4	8	16	−6			
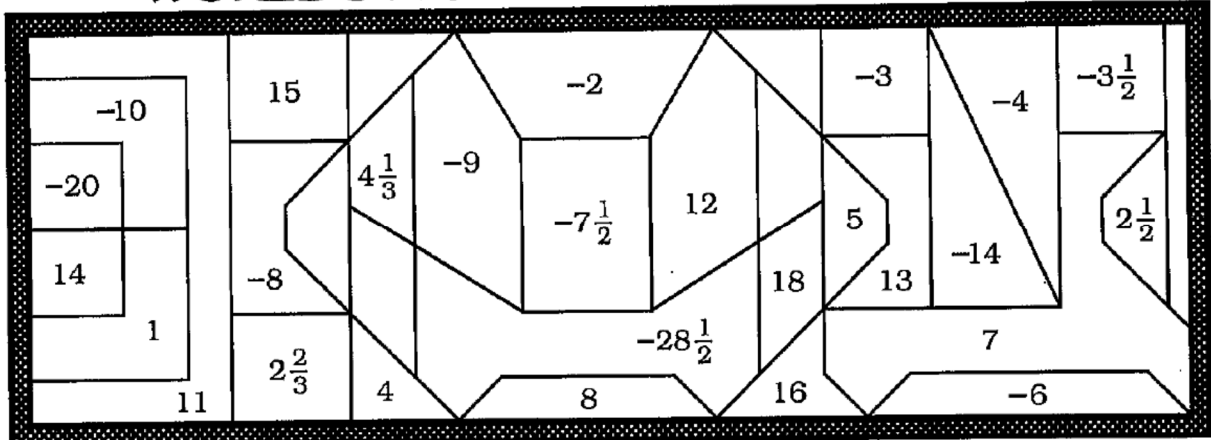
Shade in the area containing each solution.

1. $5x + 2(x + 4) = 64$

2. $9(y - 2) + 4 = 31$

3. $7 + 4(2a + 15) = -13$

4. $6(n - 5) - 11n = 0$

5. $20 = 8 + 3(12 + 4x)$

6. $-2(w - 7) + 10w = 34$

7. $9y - 4(y + 5) = 40$

8. $10 - 3(m - 2) = 8$

9. $16d - (4 - 5d) = -67$

10. $7(6x - 1) + x = 36$
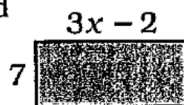
11. $11 - 2(8 + 3p) = 7^2$

12. $\frac{1}{4}(5b + 11) = 19$

13. $\frac{2}{7}(4m - 18) = 12$

14. $75 = 3(-10t - 3) + 6t$

15. $-\frac{5}{6}(9 + 2x) = 40$

16. Write an equation and solve for x if the area of this rectangle is 133 square units.

7 $3x - 2$

17. The Big Screamer Coaster carries 92 people altogether. Some of its cars carry 4 passengers, and the rest carry 6 passengers. There are three less 6-passenger cars than 4-passenger cars. How many 4-passenger cars are there?