

Solving Quadratics Practice

#31

Solve each equation by using the **Quadratic Formula**.

1. $2x^2 - 7x - 8 = 0$

2. $x^2 + 2x = -1$

Solve each equation by **Factoring**.

3. $3x^2 + 13x + 4 = 0$

4. $x^2 - 12x + 36 = 0$

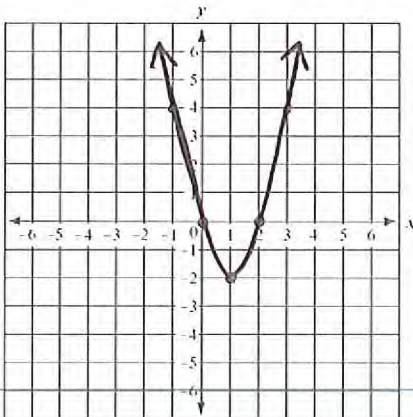
Solve each equation by **Taking the Square Root**.

5. $2(x^2 - 11) = 20$

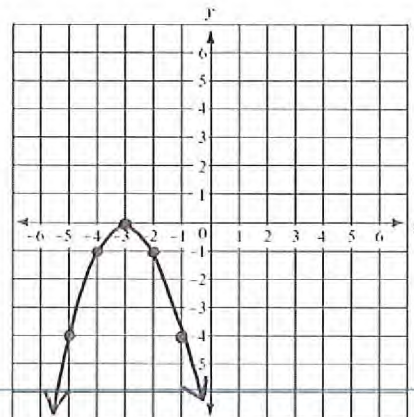
6. $3(x + 5)^2 = 36$

Solve each equation by **Graphing**.

7.



8.



For each quadratic, identify the listed characteristics. (To find the solutions, let $y=0$.)

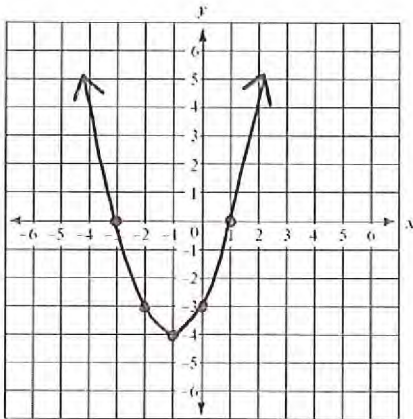
9. $y = -(x + 3)^2 + 36$

Vertex: _____
AOS: _____
Extrema: _____
y-intercept: _____
solutions: _____
zeros: _____
x-intercepts: _____

10. $y = -3(x - 4)(x + 8)$

Vertex: _____
AOS: _____
Extrema: _____
y-intercept: _____
solutions: _____
zeros: _____
x-intercepts: _____

11.



Vertex: _____
AOS: _____
Extrema: _____
y-intercept: _____
solutions: _____
zeros: _____
x-intercepts: _____

12. $y = 3x^2 - 10x - 10$

Vertex: _____
AOS: _____
Extrema: _____
y-intercept: _____
solutions: _____
zeros: _____
x-intercepts: _____

Solving Quadratics Practice

#31

Solve each equation by using the **Quadratic Formula**.

1. $2x^2 - 7x - 8 = 0$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-8)}}{2(2)}$$

$$= \frac{7 \pm \sqrt{49 + 64}}{4} = \frac{7 \pm \sqrt{113}}{4}$$

2. $x^2 + 2x = -1$

$$x^2 + 2x + 1 = 0$$

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(1)}}{2(1)}$$

$$= \frac{-2 \pm \sqrt{4 - 4}}{2} = \frac{-2 \pm \sqrt{0}}{2} = \frac{-2 \pm 0}{2}$$

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

Solve each equation by **Factoring**.

3. $3x^2 + 13x + 4 = 0$

$$\frac{12}{3} \cdot \frac{1}{3} = 12$$

$$\frac{12}{3} + \frac{1}{3} = 13$$

	x	4
3x	3x ²	12x
1	x	4

$$3x + 1 = 0 \quad x + 4 = 0$$

$$\frac{3x}{3} = \frac{-1}{3} \quad \boxed{x = -4}$$

$$\boxed{x = -\frac{1}{3}}$$

$(3x+1)(x+4)$

4. $x^2 - 12x + 36 = 0$

$$\frac{-6}{-6} \cdot \frac{-6}{-6} = 36$$

$$\frac{-6}{-6} + \frac{-6}{-6} = -12$$

	x	-6
x	x ²	-6x
-6	-6x	36

$$x - 6 = 0 \quad x - 6 = 0$$

$$+6 +6 \quad +6 +6$$

$$x = 6 \quad x = 6$$

$$\boxed{x = 6}$$

$(x-6)(x-6)$

Solve each equation by **Taking the Square Root**.

5. $2(x^2 - 11) = 20$

$$\frac{2}{2} \quad \frac{2}{2}$$

$$x^2 - 11 = 10$$

$$+11 \quad +11$$

$$x^2 = 21$$

$$\sqrt{x^2} = \sqrt{21}$$

$$\boxed{x = \pm \sqrt{21}}$$

6. $3(x+5)^2 = 36$

$$\frac{3}{3} \quad \frac{3}{3}$$

$$(x+5)^2 = 12$$

$$\sqrt{(x+5)^2} = \sqrt{12}$$

$$x+5 = \pm \sqrt{4 \cdot 3}$$

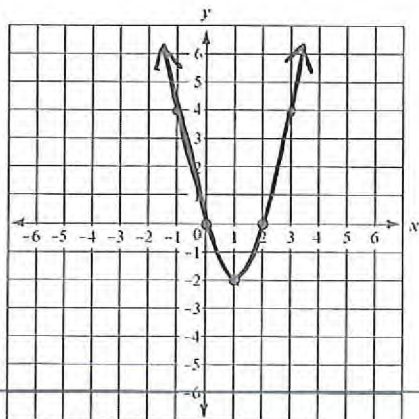
$$x+5 = \pm 2\sqrt{3}$$

$$\frac{-5}{-5} \quad \frac{-5}{-5}$$

$$\boxed{x = -5 \pm 2\sqrt{3}}$$

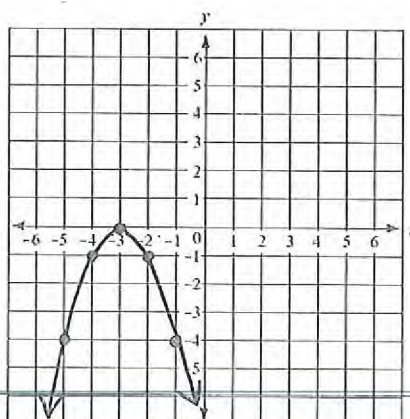
Solve each equation by **Graphing**.

7.



$\boxed{0 \text{ and } 2}$

8.



$\boxed{-3}$

For each quadratic, identify the listed characteristics. (To find the solutions, let $y=0$.)

9. $y = -(x+3)^2 + 36$

Vertex: $(-3, 36)$
 AOS: $x = -3$
 Extrema: max at 36
 y-intercept: $(0, 27)$
 solutions: $3, -9$
 zeros: $3, -9$
 x-intercepts: $(3, 0), (-9, 0)$

$$\begin{aligned} &= -(0+3)^2 + 36 \\ &= -(3)^2 + 36 \\ &= -9 + 36 \\ &= 27 \end{aligned}$$

$$\begin{aligned} 0 &= -(x+3)^2 + 36 \\ -36 &= -(x+3)^2 \\ 36 &= (x+3)^2 \\ \sqrt{36} &= \sqrt{(x+3)^2} \\ \pm 6 &= x+3 \\ -3 \pm 6 &= x \\ 3, -9 &= x \end{aligned}$$

10. $y = -3(x-4)(x+8)$

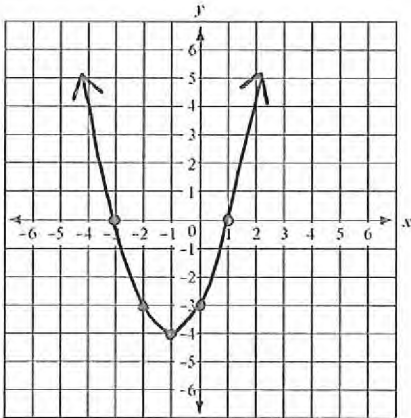
Vertex: $(-2, 108)$
 AOS: $x = -2$
 Extrema: max at 108
 y-intercept: $(0, 96)$
 solutions: $4, -8$
 zeros: $4, -8$
 x-intercepts: $(4, 0), (-8, 0)$



$$\begin{aligned} y &= -3(-2-4)(-2+8) \\ &= -3(-6)(6) \\ &= 108 \end{aligned}$$

$$\begin{aligned} &= -3(0-4)(0+8) \\ &= -3(-4)(8) \\ &= 96 \end{aligned}$$

11.



Vertex: $(-1, -4)$
 AOS: $x = -1$
 Extrema: min at -4
 y-intercept: $(0, -3)$
 solutions: $-3, 1$
 zeros: $-3, 1$
 x-intercepts: $(-3, 0), (1, 0)$

12. $y = 3x^2 - 10x - 10$

Vertex: $(5/3, -55/3)$
 AOS: $x = 5/3$
 Extrema: min at $-55/3$
 y-intercept: $(0, -10)$
 solutions: $\frac{5 \pm \sqrt{55}}{3}$
 zeros: $\frac{5 + \sqrt{55}}{3}, \frac{5 - \sqrt{55}}{3}$
 x-intercepts: $(\frac{5 + \sqrt{55}}{3}, 0)$
 $(\frac{5 - \sqrt{55}}{3}, 0)$

$$\begin{aligned} x &= \frac{-(-10)}{2(3)} = \frac{10}{6} = \frac{5}{3} & y &= 3\left(\frac{5}{3}\right)^2 - 10\left(\frac{5}{3}\right) - 10 \\ & & &= \frac{25}{3} - \frac{50}{3} - 10 \\ & & &= -\frac{25}{3} - 10 = -\frac{55}{3} \end{aligned}$$

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(-10)}}{2(3)}$$

$$\begin{aligned} &= \frac{10 \pm \sqrt{100 + 120}}{6} = \frac{10 \pm \sqrt{220}}{6} \\ &= \frac{10 \pm \sqrt{4 \cdot 55}}{6} = \frac{10 \pm 2\sqrt{55}}{6} \end{aligned}$$

$$\begin{aligned} &\frac{10 \pm 2\sqrt{55}}{6} \text{ or} \\ &\frac{5 \pm \sqrt{55}}{3} \end{aligned}$$

2-110
 4-55
 5-44
 10-22
 11-20