## Bell Work

Find the roots of each quadratic function. Show all work.

1. $f(x) = x^2 + 12x + 40$

2. $f(x) = x^2 - 8x + 27$

3. What is the quadratic formula?

4. What is the equation for the constant parent function?

# Find the roots using the quadratic formula.

$$f(x) = \overset{a}{2}x^2 + \overset{b}{3}x + \overset{c}{10}$$

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(10)}}{2(2)} = \frac{-3 \pm \sqrt{9 - 80}}{4}$$

$$= \frac{-3 \pm \sqrt{-71}}{4} = \frac{-3 \pm \sqrt{71}\,i}{4}$$

$$= \frac{-3}{4} \pm \frac{\sqrt{71}\,i}{4}$$

*Always break up your complex numbers into the 2 parts: real and imaginary.*

# Find the roots using the quadratic formula.

$$f(x) = \underset{a}{3}x^2 - \underset{b}{4}x + \underset{c}{9}$$

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(3)(9)}}{2(3)} = \frac{4 \pm \sqrt{16 - (108)}}{6}$$

$$= \frac{4 \pm \sqrt{-92}}{6} = \frac{4 \pm \sqrt{4}\sqrt{23}\,i}{6} = \frac{4 \pm 2\sqrt{23}\,i}{6} = \frac{2 \pm \sqrt{23}\,i}{3}$$

*The 124 can be reduced by 4, a square number.*

*All 3 outside numbers can be reduced by 2. This only happens when all 3 can be reduced.*

$$= \frac{2}{3} \pm \frac{\sqrt{23}\,i}{3}$$

# Find the roots using the quadratic formula.

$$f(x) = \overset{a}{6}x^2 + \overset{b}{x} + \overset{c}{8}$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(6)(8)}}{2(6)} = \frac{-1 \pm \sqrt{1 - 192}}{12} = \frac{-1 \pm \sqrt{-191}}{12}$$

$$= \frac{-1 \pm \sqrt{191}\,i}{12} = -\frac{1}{12} \pm \frac{\sqrt{191}\,i}{12}$$

# Find the roots using the quadratic formula.

$$\underset{a}{} \quad \underset{b}{} \quad \underset{c}{}$$
$$f(x) = 4x^2 - 8x + 9$$

*The 80 can be reduced by 16, a square number.*

$$x = \frac{8 \pm \sqrt{(8)^2 - 4(4)(9)}}{2(4)} = \frac{8 \pm \sqrt{64 - 144}}{8} = \frac{8 \pm \sqrt{-80}}{8}$$

$$= \frac{8 \pm \sqrt{16}\sqrt{5}\, i}{8} = \frac{8 \pm 4\sqrt{5}\, i}{8} = \frac{2 \pm \sqrt{5}\, i}{2} = \frac{2}{2} \pm \frac{\sqrt{5}\, i}{2}$$

*All 3 outside numbers can be reduced by 4.*

$$= 1 \pm \frac{\sqrt{5}\, i}{2}$$

# The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

You need to memorize it.

## Assignment:

Page 361 # 12 – 20 evens, 18 – 28 evens

**Find the zeros of each function by using the Quadratic Formula.**

**2.** $f(x) = x^2 + 7x + 10$

**3.** $g(x) = 3x^2 - 4x - 1$

**4.** $h(x) = 3x^2 - 5x$

**5.** $g(x) = -x^2 - 5x + 6$

**6.** $h(x) = 4x^2 - 5x - 6$

**7.** $f(x) = 2x^2 - 19$

**8.** $f(x) = 2x^2 - 2x + 3$

**9.** $r(x) = x^2 + 6x + 12$

**10.** $h(x) = 3x^2 + 4x + 3$

**11.** $p(x) = x^2 + 4x + 10$

**12.** $g(x) = -5x^2 + 7x - 3$

**13.** $f(x) = 10x^2 + 7x + 4$

**Find the zeros of each function by using the Quadratic Formula.**

**18.** $f(x) = 3x^2 - 10x + 3$

**19.** $g(x) = x^2 + 6x$

**20.** $h(x) = x(x - 3) - 4$

**21.** $g(x) = -x^2 - 2x + 9$

**22.** $p(x) = 2x^2 - 7x - 8$

**23.** $f(x) = 7x^2 - 3$

**24.** $r(x) = x^2 + x + 1$

**25.** $h(x) = -x^2 - x - 1$

**26.** $f(x) = 2x^2 + 8$

**27.** $f(x) = 2x^2 + 7x - 13$

**28.** $g(x) = x^2 - x - 5$

**29.** $h(x) = -3x^2 + 4x - 4$