

## 10.6 - Using the Quadratic Formula

$$y = ax^2 + bx + c$$

$$a =$$

$$b =$$

$$c =$$

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

$$\Delta = 0$$

**1 EXAMPLE** Solve  $x^2 + 2 = -3x$ .

$$x^2 + 3x + 2 = 0$$

$$a = 1$$

$$b = 3$$

$$c = 2$$

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

$$\frac{-3 \pm \sqrt{3^2 - 4(1)(2)}}{2(1)} \quad 9 - 8$$

$$\frac{-3 \pm \sqrt{1}}{2}$$

$$\begin{aligned} & \frac{-3 + 1}{2} & \frac{-3 - 1}{2} = \frac{-4}{2} = -2 \\ & \frac{-2}{2} = -1 & \end{aligned}$$

**2 EXAMPLE** Solve  $3x^2 + 4x - 8 = 0$ . Round the solutions to the nearest hundredth.

$$a = 3$$

$$b = 4$$

$$c = -8$$

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

$$\frac{-4 \pm \sqrt{16 - 4(3)(-8)}}{6}$$

$$16 + 96$$

$$\frac{-4 \pm \sqrt{112}}{6}$$

$$\frac{-4 + 10.59}{6}$$

$$\frac{6.59}{6} = 1.09$$

$$\frac{-4 - 10.59}{6} = \frac{-14.59}{6}$$

$$= -2.43$$

$$2x^2 + 5x + 3 = 0$$

$$a=2$$

$$b=5$$

$$c=3$$

$$\frac{-5 \pm \sqrt{25 - 4(2)(3)}}{4}$$

$$25 - 24$$

$$\frac{-5 \pm \sqrt{1}}{4}$$

$$\frac{-5 + 1}{4}$$

$$\frac{-5 - 1}{4} = \frac{-6}{4} = \left(\frac{-3}{2}\right) \text{ or } \boxed{-1.5}$$

$$\frac{-4}{4} = \boxed{-1}$$

$$12x^2 - 77x - 20 = 0$$

$$a = 12$$

$$b = -77$$

$$c = -20$$

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

$$-48 - (-20)$$

$$\frac{-(-77) \pm \sqrt{(-77)^2 - 4(12)(-20)}}{24}$$

$$5929 + 960$$

$$\frac{77 \pm \sqrt{6889}}{24}$$

$$24$$

$$\frac{77 + 83}{24}$$

$$\frac{77 - 83}{24}$$

$$6.67$$

$$-0.25$$

**4 EXAMPLE** Which method(s) would you choose to solve each equation?

Justify your reasoning.

a.  $5x^2 + 8x - 14 = 0$

quadratic

→ ① factoring

~~②~~ ② square roots

\*NO "b" term

→ b.  $25x^2 - 169 = 0$

square roots b/c no "b"

③ completing square

(x-3)(x+1) → c.  $x^2 - 2x - 3 = 0$

factor b/c it's easily factored

~~④~~ \* "a" = 1  
④ quadratic

d.  $x^2 - 5x + 3 = 0$

complete square b/c it's not favorable

\* everytime

(x-1)(x-3)

e.  $16x^2 - 96x + 135 = 0$

quadratic

$$25x^2 - 169 = 0$$

$$+169 \quad +169$$

$$\frac{25x^2}{25} = \frac{169}{25}$$

$$\sqrt{x^2} = \sqrt{6.76}$$

$$x = \pm 2.6$$

Homework: pg. 588 #2-14even, 18-23all

$$a = 1$$

ex:

$$x^2 + 2x + 5$$

can it be easily factored?

yes ✓

factor if solve

no

complete the square

$$a \neq 1$$

ex:

$$7x^2 + 12x - 9$$

is there a "b" term?

yes ✓

quadratic

no

square roots