

1. Simplify each expression.

$$\begin{aligned} \text{a. } & \frac{4 - \sqrt{(-4)^2 - 4(2)(-3)}}{2(2)} \\ &= \frac{4 - \sqrt{16 + 24}}{4} \\ &= \frac{4 - \sqrt{40}}{4} = \frac{4 - 2\sqrt{10}}{4} = \boxed{1 - \frac{\sqrt{10}}{2}} \end{aligned}$$

$$\begin{aligned} \text{b. } & \frac{-8 - \sqrt{(8)^2 - 4(10)(2)}}{2(10)} = \frac{-8 - \sqrt{64 - 80}}{20} \\ &= \frac{-8 - 4i}{20} \\ &= \frac{-8}{20} - \frac{4i}{20} \\ &= \boxed{-\frac{2}{5} - \frac{1}{5}i} \end{aligned}$$

$$\begin{aligned} \text{c. } & \sqrt{-80} \\ &= \boxed{4i\sqrt{5}} \end{aligned}$$

$$\begin{aligned} \text{d. } & \sqrt{200} \\ &= \boxed{10\sqrt{2}} \end{aligned}$$

2. Solve the equation by using the quadratic formula. Remember the quadratic formula is:

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

$$x = \frac{-6 \pm \sqrt{36 - 4(1)(8)}}{2(1)}$$

a. $x^2 + 6x + 8 = 0$

$$\begin{aligned} x &= \frac{-6 \pm \sqrt{4}}{2} \\ x &= \frac{-6 \pm 2}{2} \end{aligned}$$

b. Now solve the equation by factoring.

$$(x+4)(x+2) = 0$$

$$\boxed{x = -4 \text{ or } -2}$$

$$x = \frac{-6+2}{2} \text{ or } x = \frac{-6-2}{2}$$

$$\boxed{x = -2 \text{ or } x = -4}$$

3. Solve the equation $2x^2 + 6x + 1 = 0$ by using the quadratic formula. Simplify the solution as much as possible.

$$x = \frac{-6 \pm \sqrt{36 - 4(2)(1)}}{2(2)}$$

$$x = \frac{-6 \pm \sqrt{28}}{4}$$

$$x = \frac{-6 \pm 2\sqrt{7}}{4}$$

$$x = \frac{-6}{4} \pm \frac{2\sqrt{7}}{4}$$

$$x = \frac{-3}{2} \pm \frac{\sqrt{7}}{2}$$

4. The zeros of a function are also the x-intercepts of the graph of the function. The value of y is always zero along the x-axis. Find the zeros of the function $g(x) = 8x^2 + 2x - 3$ by setting $\boxed{= 0}$, then:

a. solve the equation using the quadratic formula

$$x = \frac{-2 \pm \sqrt{4 - 4(8)(-3)}}{2(8)}$$

$$x = \frac{-2 \pm \sqrt{100}}{16}$$

$$x = \frac{-2 \pm 10}{16}$$

$$x = \frac{-2+10}{16} \text{ or } x = \frac{-2-10}{16}$$

b. check your answer to part a by using graphing technology

$$x = \frac{1}{2} \text{ or } x = -\frac{3}{4}$$

c. write the function as two factors.

$$g(x) = \left(x - \frac{1}{2}\right)\left(x + \frac{3}{4}\right)$$

5. Find the zero of the function $h(t) = 3x^2 - 4x + 5$:

a. by using the quadratic formula

$$x = \frac{4 \pm \sqrt{16 - 4(3)(5)}}{2(3)}$$

$$x = \frac{4 \pm \sqrt{-44}}{6}$$

$$x = \frac{4 \pm 2i\sqrt{11}}{6}$$

$$x = \frac{2}{3} \pm \frac{i\sqrt{11}}{3}$$

c. Check your answer to part a using graphing technology. What do you notice? Explain your reasoning.

The graph never crosses the x-axis
so there are no real solutions,