

Name F

Class _____

Date _____

Examples

- ② **Applying the Quadratic Formula** A child throws a ball upward with an initial upward velocity of 15 ft/s from a height of 2 ft. If no one catches the ball, after how many seconds will it land? Use the vertical motion formula $h = -16t^2 + vt + c$, where $h = 0$, $v =$ velocity, $c =$ starting height, and $t =$ time to land. Round to the nearest hundredth of a second.

Step 1 Use the vertical motion formula.

$$h = -16t^2 + vt + c$$

$$0 = -16t^2 + \boxed{15}t + \boxed{2} \quad \text{Substitute } \boxed{0} \text{ for } h, \boxed{15} \text{ for } v, \text{ and } \boxed{2} \text{ for } c.$$

Step 2 Use the quadratic formula.

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

$$t = \frac{-\boxed{15} \pm \sqrt{\boxed{15}^2 - 4(\boxed{-16})(\boxed{2})}}{2(\boxed{-16})} \quad \text{Substitute } \boxed{} \text{ for } a, \boxed{} \text{ for } b,$$

$$t = \frac{-\boxed{15} \pm \sqrt{\boxed{225} + \boxed{128}}}{\boxed{-32}} \quad \text{Simplify.}$$

$$t = \frac{-\boxed{15} \pm \sqrt{\boxed{353}}}{\boxed{-32}}$$

$$t \approx \frac{-\boxed{15} + \boxed{18.8}}{\boxed{-32}} \quad \text{or } t \approx \frac{-\boxed{15} - \boxed{18.9}}{\boxed{-32}} \quad \text{Write two solutions.}$$

$$t \approx \boxed{-.12} \quad \text{or } t \approx \boxed{1.06} \quad \text{Simplify. Use the positive answer because it is the only reasonable solution.}$$

The ball will land in about $\boxed{1.06}$ seconds.

- ③ **Choosing an Appropriate Method** Which method(s) would you choose to solve each equation? Justify your reasoning.

a. $5x^2 + 8x - 14 = 0$ $\boxed{\text{Quadratic Formula}}$ the equation $\boxed{\text{cannot}}$ be factored easily.

b. $25x^2 - 169 = 0$ Square $\boxed{\text{roots}}$; there is no x term. 10.4-10.7

c. $x^2 - 2x - 3 = 0$ $\boxed{\text{Factoring}}$; the equation \boxed{is} easily factorable.

d. $x^2 - 5x + 3 = 0$ $\boxed{\text{Quadratic Formula}}$, completing the square, or graphing; the x^2 term is 1, but the equation $\boxed{is not}$ factorable.

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