Name ______________________________ Period __________

5.2L Solving Quadratic Equations Using the Quadratic Formula to Find Real Solutions

1. Describe a situation where you would HAVE to use the quadratic formula to solve a quadratic equation if you did not want to graph it.

If the quadratic equation does not factor, the roots are either irrational or imaginary.

#2 – 7: Determine a, b, and c and then solve *using the quadratic formula*. Remember to show ALL work.

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

a: 2 **b:** -5 **c:** -3

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

$x = \frac{5 \pm \sqrt{49}}{4}$ → $\frac{5+7}{4}$, $\frac{5-7}{4}$

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

Could you have solved by factoring? Explain.

$\boxed{\text{Yes!}}$ $(2x+1)(x-3) = 0$ (49 is a perfect square #)

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

3. $x^2 - 7x + 9 = 0$

a: 1 **b:** -7 **c:** 9

$x = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(9)}}{2(1)}$

$\boxed{x = \frac{7 \pm \sqrt{13}}{2}}$

Could you have solved by factoring? Explain:

$\boxed{\text{No}}$; $\underbrace{b^2 - 4ac}_{13}$ is not a perfect square

13 " " " " "

4. $5x^2 + 3x = 1$

a: 5 **b:** 3 **c:** -1

$x = \frac{-3 \pm \sqrt{(3)^2 - 4(5)(-1)}}{2(5)}$

$\boxed{x = \frac{-3 \pm \sqrt{29}}{10}}$

Could you have solved by factoring? Explain.

$\boxed{\text{No}}$; 29 is not a perfect square #

5. $x^2 + x - 1 = 0$

a: 1 **b:** 1 **c:** -1

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

$\boxed{x = \frac{-1 \pm \sqrt{5}}{2}}$

Could you have solved by factoring? Explain:

$\boxed{\text{No}}$; 5 is not a perfect square #

Name ______________________________ Period __________

5.2L *Solving Quadratic Equations Using the Quadratic Formula to Find Real Solutions*

#2 – 7 (continued): Determine a, b, and c and then solve *using the quadratic formula*. Remember to show ALL work.

6. $9x^2+6x-1=0$

a: 9 **b:** 6 **c:** -1

$x = \dfrac{-6 \pm \sqrt{(6)^2-4(9)(-1)}}{2(9)}$

$x = \dfrac{-6 \pm \sqrt{72}}{18} = \dfrac{-6 \pm 6\sqrt{2}}{18}$

$\boxed{x = \dfrac{-1 \pm \sqrt{2}}{3}}$

7. $2x^2+3x+2=3$

a: 2 **b:** 3 **c:** -1

$x = \dfrac{-3 \pm \sqrt{(3)^2-4(2)(-1)}}{2(2)}$

$\boxed{x = \dfrac{-3 \pm \sqrt{17}}{4}}$

8. A cliff diver jumps up and away from the cliff as he jumps. His path can be modeled by the equation $h(t) = -16t^2+12t+25$, where h is the height, in feet, of the diver at a specific time, t, in seconds. How long will it take for the diver to reach the water below? Solve using the quadratic formula. Round answers to the nearest hundredth. *(Hint: When the diver hits the water, he is at a height of 0 ft.)*

$a = -16 \quad b = 12 \quad c = 25$

$x = \dfrac{-12 \pm \sqrt{(12)^2-4(-16)(25)}}{2(-16)}$

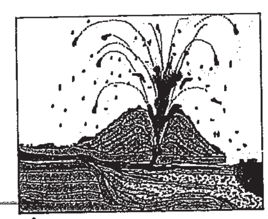
$x = \dfrac{-12 \pm \sqrt{1744}}{-32}$ $x \approx -0.93$, $x \approx 1.68$ so 1.68 seconds

9. The volcanic cinder cone Puu Puai in Hawaii was formed in 1959 when a massive "lava fountain" erupted at Kilauea Iki Crater, shooting lava hundreds of feet into the air. When the eruption was most intense, the height h (in feet) of the lava t seconds after being ejected from the ground could be modeled by $h(t) = -16t^2+352t$. Solve using any method you have learned. Round your answers to the nearest hundredth.

$-16t^2+352t=0$

a) How long was the lava in the air? $-16t(t-22)=0$

$\cancel{t=0}$ $t = 22$ secs



b) How long did it take the lava to reach its maximum height of 1936 feet?

$-16t^2+352t=1936$

$-16t^2+352t-1936=0$

$a=-16 \quad b=352 \quad c=-1936$

$t = \dfrac{-352 \pm \sqrt{(352)^2-4(-16)(-1936)}}{2(-16)}$

$t = \dfrac{-352 \pm \sqrt{0}}{-32}$

$t = 11$ seconds

Section 5.2L

5.2 *I CAN REPRESENT REAL-WORLD SITUATIONS WITH QUADRATIC EQUATIONS AND SOLVE USING APPROPRIATE METHODS. FIND REAL AND NON-REAL COMPLEX ROOTS WHEN THEY EXIST. RECOGNIZE THAT A PARTICULAR SOLUTION MAY NOT BE APPLICABLE IN THE ORIGINAL CONTEXT.*