AM: WP: Quadratic Equations

2. A rock is thrown ~~skyward~~ from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after the rock is thrown is given by $d = -16t^2 - 2t + 835$. How long after the rock is thrown is it 340 feet from the ground?

[A] $\dfrac{45}{8}$ s   [B] $\dfrac{9}{2}$ s   [C] $\dfrac{11}{2}$ s   [D] none of these

$d = -16t^2 - 2t + 835$

$340 = -16t^2 - 2t + 835$

$-340 \qquad\qquad -340$

$0 = -16t^2 - 2t + 495$

$a = -16 \quad b = -2 \quad c = 495$

$-\dfrac{45}{8}$ s

$\dfrac{11}{2}$ s

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AM: WP: Quadratic Equations

1. The perimeter of a rectangular concrete slab is 110 feet, and its area is 624 square feet. What is the length of the <u>longer side</u> of the slab?

[A] 37 ft [B] 40 ft [C] 42 ft [D] none of these

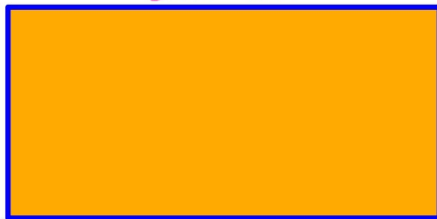**Variable and Equation Definitions (with units)**

L= *length*

W= width

P= perimeter = 110ft

A= area = 624 ft²

16 (39)

$2\ell + 2w = 110$
$\ell + w = 55$
$-w \quad -w$
$\ell = 55 - w$

$\ell \times w = A$
$(55 - w)w = 624$
$55w - w^2 = 624$
$-624 \quad -624$
$-w^2 + 55w - 624 = 0$

55-w

W

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$a = -1 \quad b = 55 \quad c = -624$

AM: WP: Quadratic Equations

3. The *product* of two consecutive positive integers is 322 more than the next integer. What is the largest of the three integers?

[A] 21   [B] 16   **[C] 20**   [D] 18

Variable and Equation Definitions (with units)

18   $x =$ 1st integer

19   $y =$ 2nd integer $\quad x+1$

20   $z =$ 3rd integer $\quad x+2$

$$x \cdot y = z + 322$$

$$x(x+1) = x + 2 + 322$$

$$x^2 + x = x + 324$$

$$-x \quad -x$$

$$\sqrt{x^2} = \sqrt{324}$$

$$x = \pm 18$$

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AM: WP: Quadratic Equations

4. The number of new cars purchased in a city can be modeled by the equation
$C = 22t^2 + 192t + 3689$, where C is the number of new cars and $t = 0$ corresponds to the number of new cars purchased in 1970. In what year will the number of new cars reach 26,000?

[A] 1979   [B] 1997   [C] 1984   [D] 2047

$$26000 = 22t^2 + 192t + 3689$$
$$-26000 \qquad\qquad\qquad\qquad -26000$$
$$0 = 22t^2 + 192t - 22311$$
$$a = 22 \quad b = 192 \quad c = -22311$$
$$\frac{-192 \pm 1414.3}{44}$$

27.77

-30.51

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Practice Quiz #2

- 2. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after the rock is thrown is given by $d = -16t^2 - 5t + 50$.

  a) State the initial velocity and initial height of the rock, use this information to describe the vertical path the rock travels. (Use correct units!)

  The initial velocity is ___-5 ft/sec___ **the initial height is** ___50 ft___ **, therefore…**
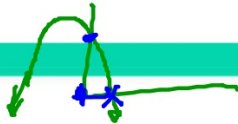
b) Use an appropriate analytical method to determine the maximum height of the rock and justify your answer in a complete sentence.

The maximum height of the rock is _50ft_, which is the same as the _initial height_ of the rock or the _y-intercept_ of the graph, because the rock only moves downward from the initial height.

OR

The maximum height of the rock is _____, which is the same as the _y-value of the vertex_ of the parabola, because ...

x y-value (K)
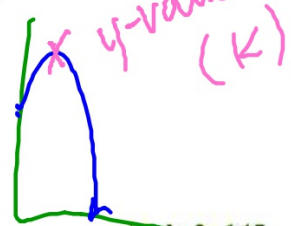
c) Use parts a. and b. to state the relevant domain and range for the physics experiment and justify your answer in a complete sentence.

Since the experiment starts when t= _$0s$_ **and stops when t=** _$1.62s$_ **, the domain of the function is** _$[0, 1.62]$_ **. Since the minimum height of the rock is** _$0ft$_ **and the maximum height of the rock is** _$50ft$_ **the range of the function is** _$[0, 50]$_ **.**

$$-16t^2 - 5t + 50 = 0$$
$$a = -16 \quad b = -5 \quad c = 50$$

-1.93 1.62