

## Bellwork: Algebra 1

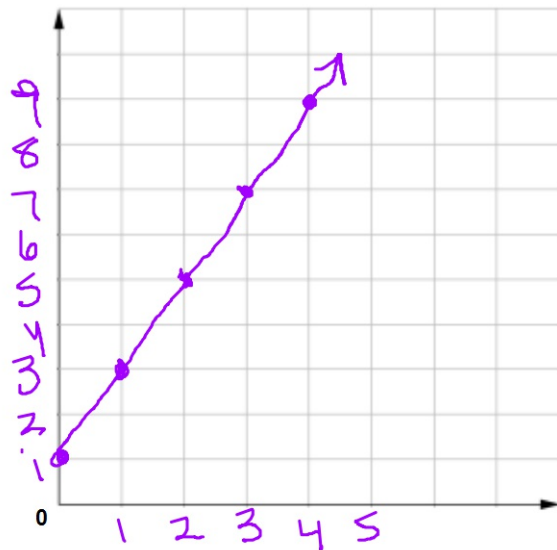
1. Happy Thursday!!
2. Take out your homework.
3. You need a calculator and your Algebra Nation Book.
4. Answer the following question on your THURSDAY

Bellwork: Graph the following equation by using the table below:

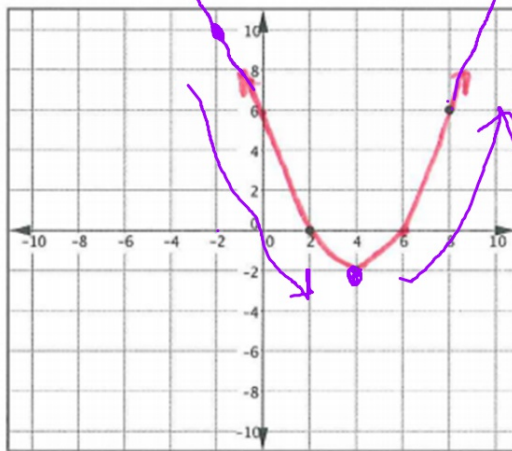
$$y = 2x + 1$$

| x | y |
|---|---|
| 0 | 1 |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |

$y = 2(0) + 1$   
 $2(1) + 1$   
 $2(2) + 1$   
 $2(3) + 1$



1. The point  $(4, -2)$  is the vertex of the graph of a quadratic function. The points  $(8, 6)$  and  $(2, 0)$  also fall on the graph of the function. Complete the graph of this quadratic function by first finding two additional points on the graph.



**Domain:**  $-\infty < x < \infty$

**Range:**

$(4, -2)$

$y \geq -2$

Part A: What is the y-intercept of the graph?

**$(0, 6)$**

Part B: What are the x-intercepts?

**$(2, 0)$  and  $(6, 0)$**

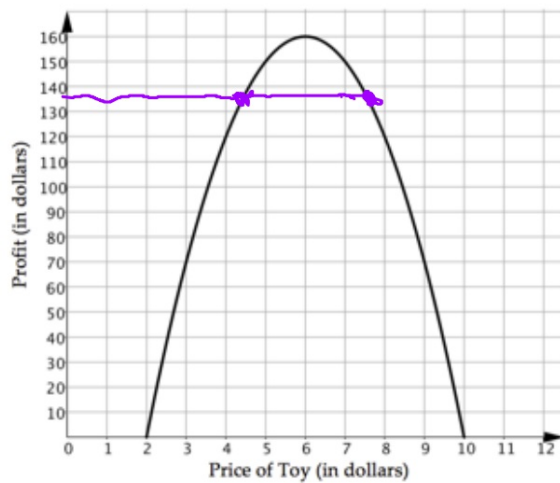
Part C: Find the interval on which the rate of change is always positive.

**$x > 4$**

Part D: What is the sign of the leading coefficient for this quadratic function? How do you know?

**Positive because it opens up**

Toy Universe is manufacturing a new toy and deciding on a price that will result in a maximum profit. The graph below represents profit  $P$  generated by each price of a toy  $x$ .



Part A: If the company wants to make a maximum profit, what should the price of a new toy be?

**\$6 because it's the maximum**

Part B: What is the minimum price of a toy that will produce profit for the company? Explain your answer.

**\$2.01 because less than that will make no money or lose money**

Part C: If the company wants to make a profit of \$137, for how much should the toy be sold?

**\$4.50 or \$7.50**

**Section 6 - Topic 3**  
**Graphing Quadratic Functions Using a Table**

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Suppose you jump into a deep pool of water from a diving platform that is 25 feet above the ground. Your height with respect to time can be modeled by the function

$$H(t) = 25 - 16t^2, \text{ where } t \text{ is time in seconds.}$$

Complete the table below.

| Time (seconds)   | 0  | 0.25 | 0.5 | 0.75 | 1 | 1.25 |
|------------------|----|------|-----|------|---|------|
| Elevation (feet) | 25 | 24   | 21  | 16   | 9 | 0    |

$$H(t) = -16t^2 + 25$$

Graph function  $H(t)$  on the following coordinate grid.



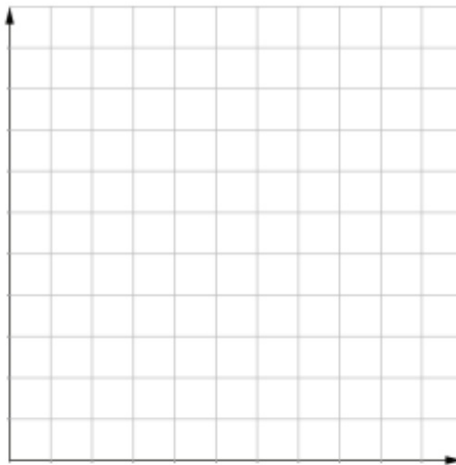
$$\begin{aligned}
 & -16(0)^2 + 25 = 25 \\
 & -16(.25)^2 + 25 = 24 \\
 & -16(.5)^2 + 25 = 21 \\
 & -16(.75)^2 + 25 = 16 \\
 & -16(1)^2 + 25 = 9 \\
 & -16(1.25)^2 + 25 = 0
 \end{aligned}$$

$$\begin{aligned}
 & -16(1)^2 + 25 \\
 & -16 + 25 \\
 & -16(.25)^2 + 25 \\
 & -25 + 25
 \end{aligned}$$

1

**Let's Practice!**

1. A construction company builds houses on square-shaped lots of various sizes. The CEO of the company decided to diversify her lots and now has houses built on rectangular-shaped lots that are 6 feet longer and 4 feet narrower than her square-shaped lots.
  - a. What is the function that models the size of the rectangular lots relative to the size of the square lots?
  
  
  
  
  
  
  
  
  
  
  - b. Complete the table below and graph the function.



**Try It!**

2. A business owner recorded the following data for an entire year of sales.

| <b>Month</b> | <b>Sales<br/>(in thousands<br/>of dollars)</b> |
|--------------|--|
| Jan          | 22   |
| Feb          | 45   |
| Mar          | 54   |
| April        | 63   |
| May          | 70   |
| June         | 71   |
| July         | 70   |
| Aug          | 64   |
| Sept         | 54   |
| Oct          | 38   |
| Nov          | 24   |
| Dec          | 5  |

a. Plot the data on the graph below.



b. What type of business might be represented by this graph?

lawn mowing, sun screen, pool water park

c. Would the quadratic model be an appropriate way to model data for this business going forward? Justify your answer.

yes

**BEAT THE TEST!**

1. Consider the following table of values.

|        |     |    |    |    |     |     |
|--------|-----|----|----|----|-----|-----|
| $x$    | -5  | -4 | -3 | -1 | 2   | 4   |
| $f(x)$ | -16 | -6 | 0  | 0  | -30 | -70 |

Which of the following graphs corresponds to the table of values?

