Bellwork Alg 2 Thursday, September 27, 2018

1. Use the graphing calculator to graph this quadratic and find the coordinates of the vertex. Round to the nearest hundredth.

$y = -\frac{37}{41}x^2 + \frac{9}{13}x + 1$ Vertex:

2. Write the equation of the quadratic in Vertex Form that has a vertex at $(-4, 7)$ and also passes through the point $(3, -16)$.

3. The quadratic $y = ax^2 + bx + c$ passes through these points: $(-5, 7)$ $(0, -23)$ $(3, -89)$
Find the value of $a, b,$ and c.

4. Your factory produces lemon-scented widgets. You know that each unit is cheaper, the more you produce. But you also know that costs will eventually go up if you make too many widgets, due to the costs of storage of the overstock. The guy in accounting says that your cost C for producing x thousands of units a day can be approximated by the formula $C(x) = 0.04x^2 - 8.504x + 25302$.

a) Find the minimum costs for your factory.

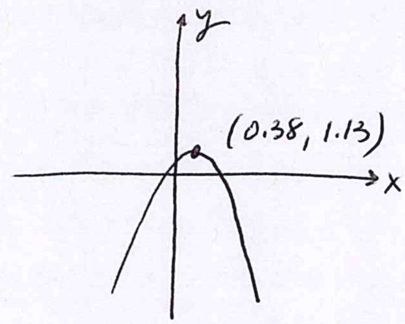
b) What daily production level will minimize your costs.

Bellwork Alg 2 Thursday, September 27, 2018 ANSWERS

1. Use the graphing calculator to graph this quadratic and find the coordinates of the vertex. Round to the nearest hundredth.

$y = -\frac{37}{41}x^2 + \frac{9}{13}x + 1$

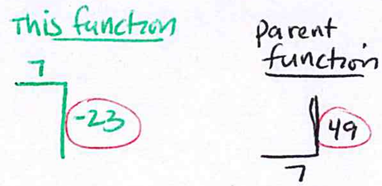
Vertex: $\boxed{(0.38, 1.13)}$

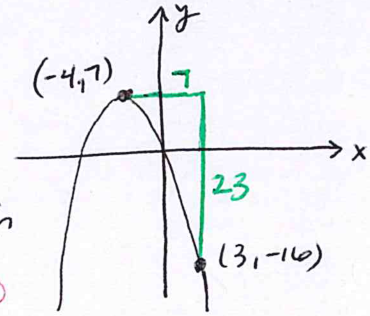


2. Write the equation of the quadratic in Vertex Form that has a vertex at $(-4, 7)$ and also passes through the point $(3, -16)$.

$$\boxed{y = \frac{-23}{49}(x+4)^2 + 7}$$

$a = \frac{-23}{49}$





3. The quadratic $y = ax^2 + bx + c$ passes through these points: $(-5, 7)$ $(0, -23)$ $(3, -89)$
Find the value of $a, b,$ and c.

* $(0, -23)$ means y-INT $= -23 \longrightarrow c = -23$

$y = ax^2 + bx - 23$

$\boxed{y = -2x^2 - 16b - 23}$

* using $(-5, 7)$

$7 = a(-5)^2 + b(-5) - 23$

$\boxed{30 = 25a - 5b}$

* using $(3, -89)$

$-89 = a(3)^2 + b(3) - 23$

$\boxed{-66 = 9a + 3b}$

Solve using ELIMINATION

$3(30 = 25a - 5b)$
$5(-66 = 9a + 3b)$

$90 = 75a - 15b$
$+ \quad -330 = 45a + 15b$

$-240 = 120a$

$a = -2$

find b:

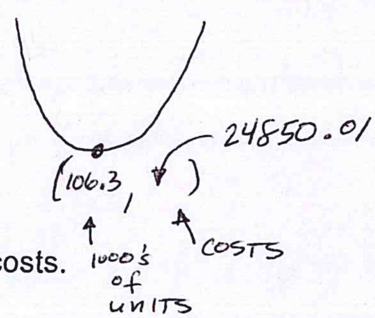
$30 = 25(-2) - 5b$
$30 = -50 - 5b$
$80 = -5b$
$-16 = b$

4. Your factory produces lemon-scented widgets. You know that each unit is cheaper, the more you produce. But you also know that costs will eventually go up if you make too many widgets, due to the costs of storage of the overstock. The guy in accounting says that your cost C for producing x thousands of units a day can be approximated by the formula $C(x) = 0.04x^2 - 8.504x + 25302$.

a) Find the minimum costs for your factory.

Y-coord of Vertex
$\boxed{24{,}850.01}$

LOS: $\frac{8.504}{2(0.04)} = 106.3$



b) What daily production level will minimize your costs.

x-coord of Vertex

106.3 Thousands of units

$(106.3)(1000) = \boxed{106{,}300}$