2. A company wants to maximize its profit. The following function models the company's profit as a function of the number of components it manufactures:

$P(c) = -0.075c^2 + 240c + 27,500$

a) Find the company's maximum profit.

(c, P)

LOS $\frac{-240}{2(-.075)} = 1600$

THIS IS THE VERTEX

Replace c with 1600

$21,500

b) How many components should it manufacture to realize this maximum profit?

1600 components

Find the y-intercept for each parabola.

Replace x with zero

In a quadratic this is always the constant.

1. $y = -4x^2 + 6x$

$-4(0)^2 + 6(0)$

$y = 0$

2. $y = 9x^2 - 12 + 3x$

y-int = -12

Find the equation for the LOS of each parabola.

LOS: $x = \frac{-b}{2a}$

1. $y = 7x^2 + 8x - 11$

$x = \frac{-8}{2(7)} = \frac{-4}{7}$

$x = -\frac{4}{7}$

2. $y = -2x^2 + 24$

$x = \frac{0}{2(-2)}$

$x = 0$

Find the coordinates of the Vertex for each parabola.

Find LOS first, this is the x-coordinate of the Vertex.

To find the y-coordinate replace x with the LOS.

1. $y = 3x^2 + 36x - 19$

$\frac{-36}{2(3)}$ → (-6, -127)

Replace x WITH -6

2. $y = -5x^2 + 18$

$\frac{0}{2(-5)}$ → (0, 18)

Replace x with 0

Does each parabola have a Maximum or a Minimum?

1. $y = 0.0015x^2 - 87x - 101$

a is pos → ∪ → MIN

2. $y = -126x + 508x^2 + 93$

a is pos → ∪ → min

Find all EXACT real solutions for each quadratic using square roots.

1. $313 - 5x^2 = 153$

$-313 \quad -313$

$-5x^2 = -160$

$\frac{-5x^2}{-5} = \frac{-160}{-5}$

$\sqrt{x^2} = \sqrt{32} = \sqrt{16 \cdot 2}$

$\pm 4\sqrt{2}$

2. $2(x-1)^2 + 7 = 57$

$-7 \quad -7$

$\frac{2(x-1)^2}{2} = \frac{50}{2}$

$\sqrt{(x-1)^2} = \sqrt{25}$

$x - 1 = \pm 5$

$x - 1 = 5 \quad x - 1 = -5$

$+1 \quad +1 \quad +1 \quad +1$

$x = 6, -4$