Graph this quadratic.

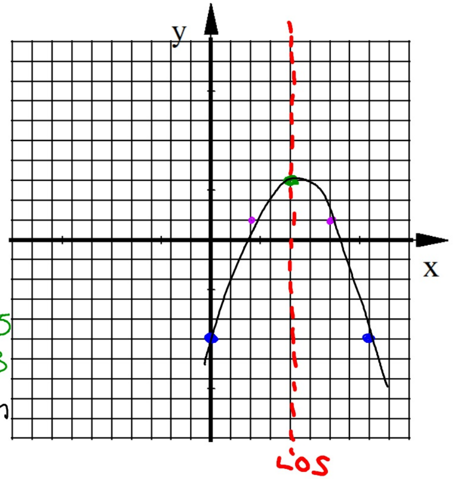
$y = -0.5x^2 + 4x - 5$

y-int = −5

LOS: $x = \frac{-4}{2(-.5)} = \frac{-4}{-1} = 4$

Vertex: (4, 3)

$-.5(4)^2+4(4)-5$
$= -8+16-5=3$



Find one more point and its reflection over LOS:

using Parent function

1ST PT: $1 \cdot -\frac{1}{2}$ → $-\frac{1}{2}$ Don't use this

2ND PT: $4 \cdot -\frac{1}{2}$ → -2 use this point

Remember, the vertex is either the maximum or the minimum of a quadratic function.

The actual max/min of the function is the y-coord of the Vertex.

The x-coord of the Vertex represents WHEN the max/min value occurs.

Use this Quadratic: $y = 2x^2 + 24x - 19$

Does this Quadratic Function have a Maximum or a Minimum?

Since a > 0 this opens up → Vertex is a Min

Find the Coordinates of the Vertex.

LOS: $x = \frac{-24}{2(2)} = \frac{-24}{4} = -6$

Vertex: (−6, −91)

$y = 2(-6)^2 + 24(-6) - 19$
$= 2(36) + 24(-6) - 19$
$= 72 - 144 - 19 = -91$

What is the Minimum of this function? −91

y at vertex

When does the minimum occur?

x at vertex

x = −6

A company makes syringes. The following equation models their Profit as a function of the number of syringes made per hour.

syringes profit
(400, 70750)

$P(s) = -0.45s^2 + 360s - 1250$

LOS: $x = \frac{-360}{2(-.45)} = 400$ $y = -.45(400)^2 + 360(400) - 1250 = 70{,}750$

1. Find the number of syringes that should be made per hour in order to maximize the company's Profit.

x

x = 400 syringes

2. What is the maximum Profit?

y

y = 70,750

A company needs to minimize their costs. The equation below gives their weekly costs (C) as a function of the number of hours each employee works (h).

$$C(h) = 6.5h^2 - 455h + 8765$$

LOS: $x = \frac{455}{2(6.5)} = 35$ $y = 6.5(35)^2 - 455(35) + 8765 = 802.5$ $(35, 802.5)$ hrs costs

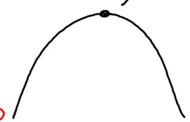
Find the $\underline{\text{minimum costs}}_{y}$ the company can incur and $\underline{\text{how many hours}}_{x}$ each employee should work to reach this minimum.

min COSTS = 802.5

#hrs = 35

A ball is shot into the air with an initial velocity of 80 ft/sec from the top of a 50 ft tall building. The following equation models the height (ft) of the object as a function of time (sec).

t ht
(2.5, 150)



$$h(t) = -16t^2 + 80t + 50$$

LOS: $x = \frac{-80}{2(-32)} = 2.5$ $y = -16(2.5)^2 + 80(2.5) + 50 = 150$

1. Find $\underbrace{\text{the time it}}_{x}$ takes the object to reach its maximum height.

   2.5 sec

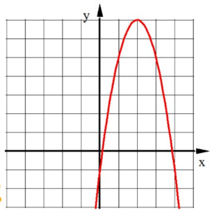
2. Find the $\underbrace{\text{maximim height}}_{y}$ of the object.

   y = 150ft

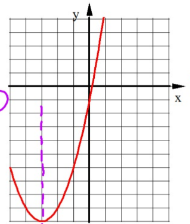
Match each equation to its graph.

1. $y = x^2 + 6x - 1$ B
   opens up
   LOS: $x = \frac{-6}{2 \cdot 1} = -3$
2. $y = x^2 - 2x - 1$ D
   opens up
   LOS: $x = \frac{2}{2(1)} = 1$
3. $y = -x^2 + 6x - 1$ E
   opens down
   LOS: $x = \frac{-6}{2(-1)} = 3$
4. $y = -2x^2 + 8x - 1$
   A it's the only one left
5. $y = -x^2 + 4x + 2$
   y-int = 2 C

A.

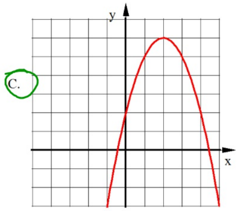


B.

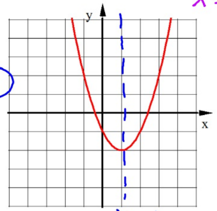


x = -3

C.

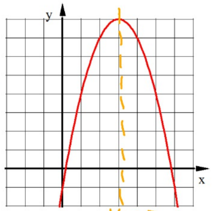


D.



x = 1

E.



x = 3