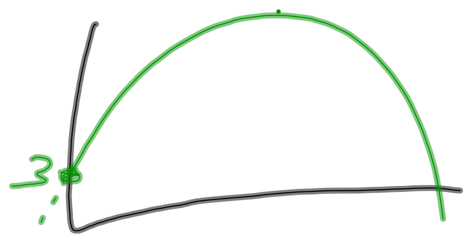
In 1993, Joe Carter hit a homerun over the left field wall at the SkyDome in the bottom of the 9th to give the Blue Jays, and Canada, an unprecedented two World Series Championships in a row! It was amazing. I was 10.

The function $h = -0.001d^2 + 0.4d + 3$

models the height, *h* feet, of Joe's ball as a function of the distance travelled, *d* feet, from home plate.



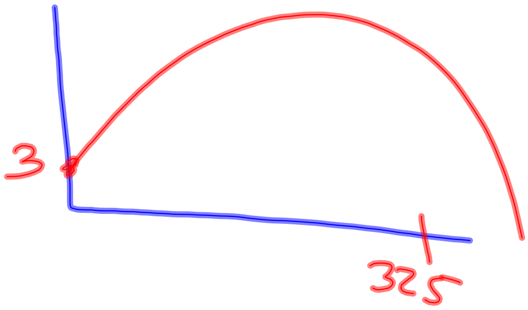
$$h = -0.001d^2 + 0.4d + 3$$

How high above the ground did Joe make contact with the ball?

3 feet

$$h = -0.001d^2 + 0.4d + 3$$

What was the height of the ball as it sailed over the wall 325 feet from home plate?



$$h = -0.001(325)^2 + 0.4(325) + 3$$

$$h = 27.375 \text{ ft.}$$

$$h = -0.001d^2 + 0.4d + 3$$

How far from home plate was the ball when it began to fall back to the ground?

x-value of vertex $= \frac{-b}{2a}$

$= \frac{-0.4}{2(-0.001)}$

$= \frac{-0.4}{-0.002}$

$= +200$

$$h = -0.001d^2 + 0.4d + 3$$

What was the height of the ball when it began to fall back to the ground?

$$h = -0.001(200)^2 + 0.4(200) + 3$$

$$h = -0.001(40000) + 80 + 3$$

$$h = -40 + 83$$

$$h = 43$$

$$h = -0.001d^2 + 0.4d + 3$$

How far from home plate would the ball have hit the ground?
(Assume the ball lands on the ground)

$$h = -0.001d^2 + 0.4d + 3$$

$$0 = -0.001d^2 + 0.4d + 3$$

$a = -0.001$
$b = 0.4$
$c = 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(0.4) \pm \sqrt{(0.4)^2 - 4(-0.001)(3)}}{2(-0.001)}$$

$$x = \frac{-0.4 \pm \sqrt{0.16 + 0.012}}{-0.002}$$

$$x = \frac{-0.4 \pm \sqrt{0.172}}{-0.002}$$

$$x = \frac{-0.4 \pm \sqrt{0.172}}{-0.002}$$

$$x = \frac{-0.4 \pm 0.4147}{-0.002}$$

Our root, the point where the ball hits the ground is:

$$x = \frac{-0.4 - 0.4147}{-0.002}$$

$$= \frac{-0.8147}{-0.002}$$

$$= +407.35$$

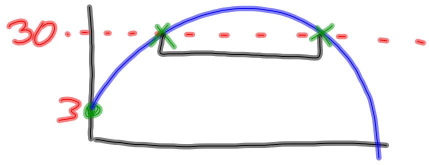
- - - - - - -

$$x = \frac{-0.4 + 0.4147}{-0.002}$$

$$x = -7.35$$

$$h = -0.001d^2 + 0.4d + 3$$

Approximately how many feet did the ball travel at a height of at least 30 feet?



$$h = -0.001d^2 + 0.4d + 3$$

$$30 = -0.001d^2 + 0.4d + 3$$

$$-30 \qquad\qquad -30$$

$$-0.001d^2 + 0.4d - 27 = 0$$

$a = -0.001$
$b = 0.4$
$c = -27$

$$x = \frac{-0.4 \pm \sqrt{0.4^2 - 4(-0.001)(-27)}}{2(-0.001)}$$

$$x = \frac{-0.4 \pm \sqrt{0.16 - 0.108}}{-0.002}$$

$$x = \frac{-0.4 \pm \sqrt{0.052}}{-0.002}$$

exact

$$x = \frac{-0.4 \pm \sqrt{0.052}}{-0.002}$$

$$x = \frac{-0.4 \pm 0.228}{-0.002}$$

$$x = \frac{-0.4 + 0.228}{-0.002}$$

$= 86$

$$x = \frac{-0.4 - 0.228}{-0.002}$$

$= 314$

∴ the ball was above 30ft. For (314−86) 228 feet!

$$h = -0.001d^2 + 0.4d + 3$$

Draw and label a sketch of the situation.

Include: zeros, vertex, y-intercept, axis of symmetry, points at which ball was 30 feet above the ground, homeplate, the outfield wall, height of the ball as it sailed over the wall.

Santa's Not Happy!

The 2DBs have been naughty!

They weren't properly prepared for their Quadratics II Unit Test ☹

To teach them a lesson, Santa decides to go house to house and throw a lump of coal into each students' chimney.

Santa arrives at Carley's house but he needs some help!

He knows that the path the coal follows is defined as **I'll never tell...** (***obviously!***) where *h* is the height of the lump of coal in metres and *d* is the horizontal distance the lump of coal has travelled since Santa released it.

A Sneak Peak

BONUS: Santa knows that if he can get the lump of coal to peak 6 metres away and 13 metres off the ground that it will land in the hole in the chimney 8 metres away and 12 metres off the ground.

From what height does Santa need to release the lump of coal to make this strategy work?