

Warm-Up

$$y = 2x^2 - 12x + 19$$

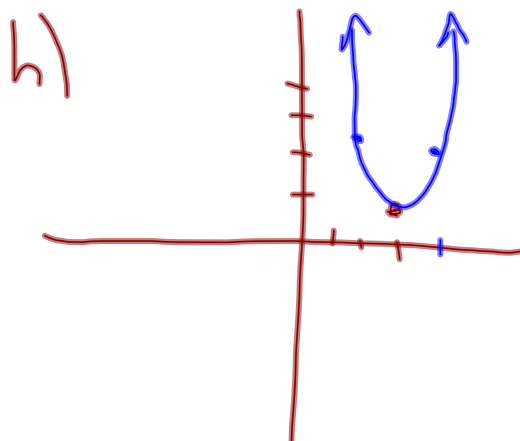
- change into standard form
- change into transformational form
- change into mapping notation
- what is the vertex?
- what is the domain?
- what is the range?
- what is the equation of the axis of symmetry?
- Sketch the graph

a) $y = 2x^2 - 12x + 19$
 $y = 2(x^2 - 6x + 9) + 19 - 18$
 $y = 2(x - 3)^2 + 1$

b) $\frac{1}{2}(y - 1) = (x - 3)^2$
c) $(x, y) \rightarrow (x + 3, 2y + 1)$

d) Vertex $(3, 1)$ e) Domain: $\{x \mid x \in \mathbb{R}\}$

g) $x = 3$ f) Range: $\{y \mid y \geq 1, y \in \mathbb{R}\}$



Example 4:

Determine the equation of the parabola that passes through the ordered pairs (-1,6), (0,1) and (2,3).

x	y
-1	6
0	1
2	3

Quadratic:
(52, —)

QuadReg
 $y = ax^2 + bx + c$
 $a = 2$
 $b = -3$
 $c = 1$
 $R^2 = 1$

(-1,6) $y = ax^2 + bx + c$ (0,1)
→ $6 = a - b + c$ (2,3)
1 = c $3 = 4a + 2b + c$

$6 = a - b + 1$ $3 = 4a + 2b + 1$
 $5 = a - b$ $2 = 4a + 2b$
a = b + 5 $2 = 4(b + 5) + 2b$
 $2 = 4b + 20 + 2b$

$-18 = 6b$
b = -3

$a = -3 + 5$
a = 2

$y = 2x^2 - 3x + 1$

$$t_n = t_1 + (n-1)d \leftarrow \text{Linear Sequence}$$

$$3, 5, 7, 9, \dots \quad t_{148}?$$

$$t_{148} = 3 + (148-1)(2)$$

$$t_{148} = 3 + 147(2)$$

$$= 3 + 294$$

$$= \underline{297}$$

Ex. 44, 49, 58, 71, 88, 109,

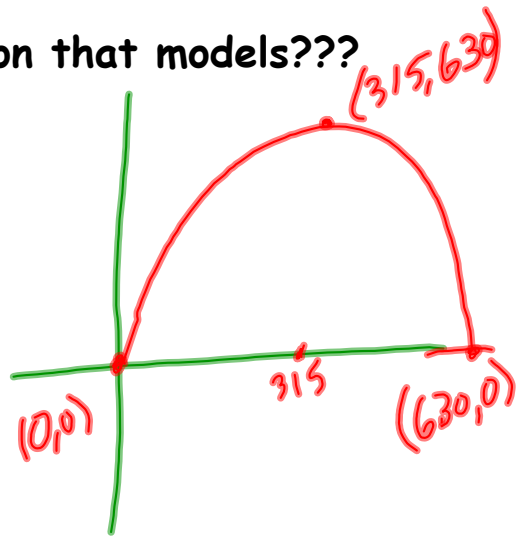
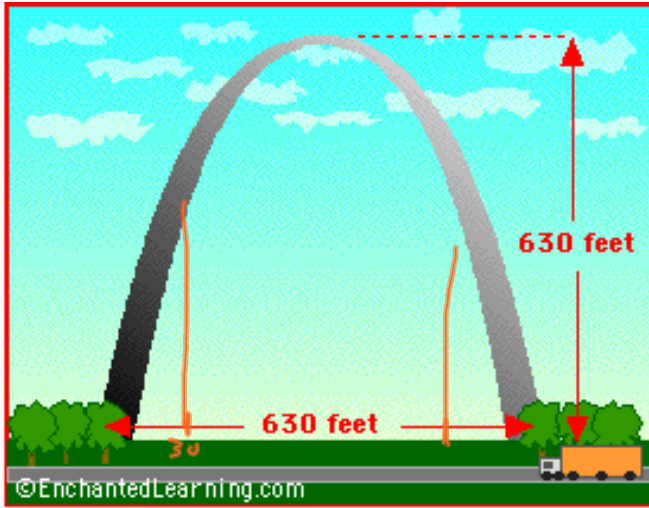
D_1 : 5, 9, 13, 17,

D_2 : 4, 4, 4, 4 — Quadratic.

$t_{137} = ?$

ONE MORE???

St. Louis Gateway Arch - Equation that models???



$$y = a(x - 315)^2 + 630$$

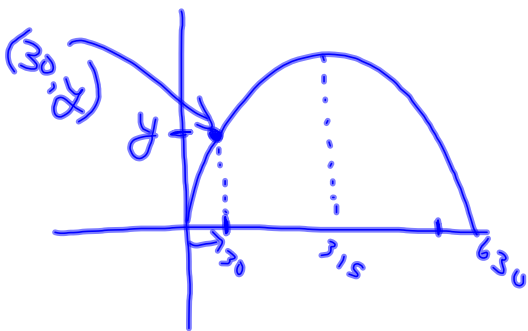
$$0 = a(0 - 315)^2 + 630$$

$$\frac{-630}{(315)^2} = a$$

The St. Louis Gateway Arch is an elegant monument to westward expansion in the USA. Located on the banks of the Mississippi River in St. Louis, Missouri, the 630-foot tall stainless steel arch rises above the city skyline. The Jefferson National Expansion Memorial consists of the Gateway Arch, the Museum of Westward Expansion, and St. Louis' Old Courthouse.

$$y = \frac{-630}{(315)^2} (x - 315)^2 + 630$$

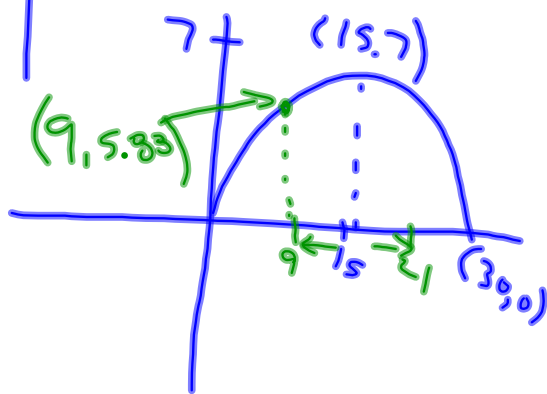
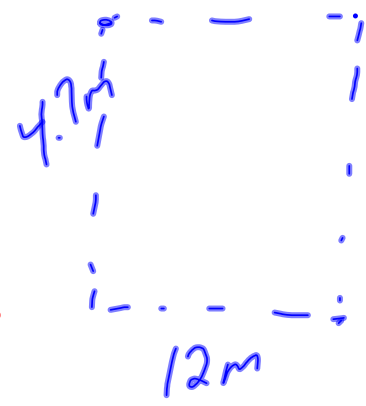
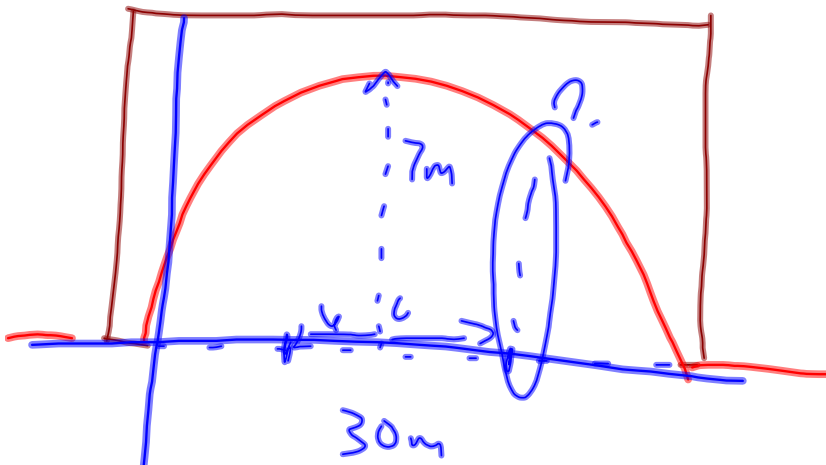
Want to move 30 feet from either end and
Insert a Brace. How long must this brace be?



$$y = \frac{-630}{(315)^2} (30 - 315)^2 + 630$$

$$= 114 \cdot (285)^2 \text{ feet}$$

2×0.2857



$$y = a(x - 15)^2 + 7$$

$$0 = a(0 - 15)^2 + 7$$

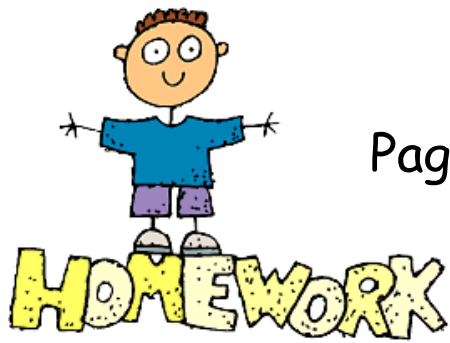
$$-7 = 225a$$

$$a = -\frac{7}{225}$$

$$y = -\frac{7}{225}(x - 15)^2 + 7$$

$$y = -\frac{7}{225}(9 - 15)^2 + 7$$

$$y = 5.88$$



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