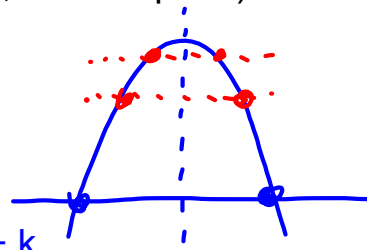


Modelling Quadratics Using Vertex Form

Apr. 18/2016

To model a situation means using an equation to represent the given data (e.g., a graph, a description).

- 1) Sketch the parabola, if possible.
- 2) Identify the key properties.
- 3) Sub vertex (h, k) into $y = a(x - h)^2 + k$
- if vertex is not given, use symmetry (e.g., zeroes)
- 4) Sub any other point to find 'a'.
- may also need to sub a 2nd point and solve a system of equations.
- 5) Does your answer make sense?



Apr 18-3:11 PM

Ex.1. Determine the equation in vertex form.

$$y = a(x-h)^2 + k$$

$$V(2, 1)$$

$$y = a(x-2)^2 + 1$$

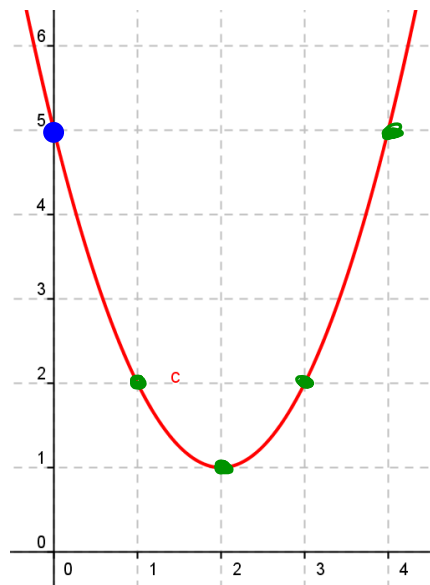
Sub $(0, 5)$

$$5 = a(0-2)^2 + 1$$

$$5 = a(4) + 1$$

$$4 = 4a$$

$$a = 1$$



$$y = (x-2)^2 + 1$$

Apr 22-8:51 PM

Ex.2 State the equation of the parabola obtained by applying these transformations to the graph of $y = x^2$.

- a vertical stretch by a factor of 5
- a vertical shift of 9 units

$$y = a(x-h)^2 + k$$

$$a = 5$$

$$k = 9$$

$$h = 0$$

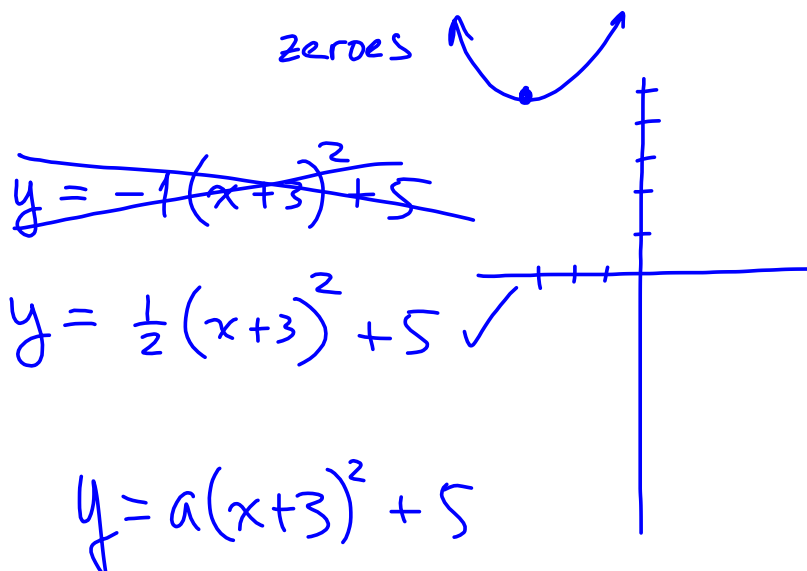
$$y = 5(x-0)^2 + 9$$

$$y = 5(x)^2 + 9$$

$$y = 5x^2 + 9$$

Apr 22-9:09 PM

Ex.3 Write a possible equation for the parabola that has a vertex at $(-3, 5)$, no zeros, and is wider than $y = x^2$.



must open UP (no zeroes): $a > 0$

wider \rightarrow v. compression : $|a| < 1$

Apr 22-9:09 PM

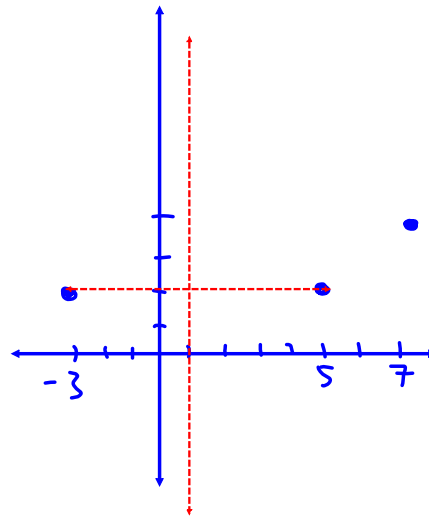
Ex.4 Find the equation of the quadratic that passes through the points $(-3, 2)$, $(5, 2)$ and $(7, 4)$.

use symmetry
(same y-values)

$$x_v = \frac{-3+5}{2}$$

$$= \frac{2}{2}$$

$$= 1$$



$$y = a(x-h)^2 + k$$

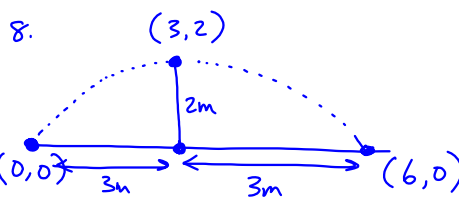
$$y = a(x-1)^2 + k$$

Sub 2 points, solve system for a, k

Apr 22-9:25 PM

Assigned Work:

p. 280 # 1, 2ace, 3ace, 4, 5ace, 6cd,
7, 8 (w/ diagram), 10, ~~15~~
a
c



$$y = a(x-h)^2 + k$$

$$y = a(x-3)^2 + 2$$

Sub any point (not the V)

$$0 = a(0-3)^2 + 2$$

$$0 = 9a + 2$$

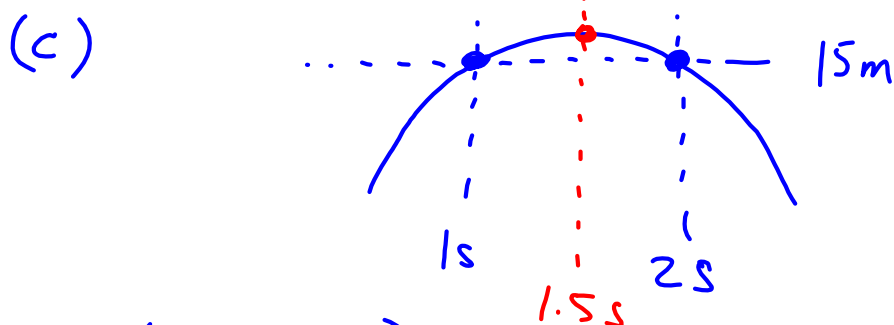
$$\frac{-2}{9} = \frac{9a}{9}$$

$$a = \frac{-2}{9}$$

$$y = \frac{-2}{9}(x-3)^2 + 2$$

10 ac

(a) ToV \rightarrow 1st, 2nd diff



$V(1.5, 16.25)$

Apr 19-2:01 PM