

## Quadratic Models in Vertex Form

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

Pg. 281 #6 a) Vertex at  $(-2, 3)$ , passes through  $(-4, 1)$

① Start with Vertex Form  $y = a(x-h)^2 + k$

↑  
point on parabola

② Substitute the values we know  
& solve for  $a$ .

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

$$-2 = 4a$$

$$1 = a(-4 - (-2))^2 + 3$$

$$\frac{-2}{4} = a$$

$$1 = a(-2)^2 + 3$$

$$-1/2 = a$$

$$1 = 4a + 3$$

$$\text{or } 0 = -0.5$$

$$1 - 3 = 4a$$

③ Write the equation in Vertex Form

$$\therefore y = -0.5(x+2)^2 + 3$$

Pg 281 #4

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

$a$  is (-)

a) Vertical stretch factor of 4

$$y = x^2 \rightarrow a$$

$$y = 4x^2$$

b) A translation of 3 units left.

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

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

c) a reflection in  $x$ -axis, followed by a translation 2 units up

$$a = -1$$

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

$$k = +2$$

d) Vertical compression by a factor of  $\frac{1}{2}$

$$a = \frac{1}{2}$$

$$y = \frac{1}{2}x^2$$

e) translation 5 units right, 4 units down

$$h = 5$$

$$k = -4$$

$$y = (x-5)^2 - 4$$

(+ f) vertical stretch factor of 2, reflection in  $x$ -axis, translated 1 unit left

$$a = 2$$

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

$$a = -2$$

$$h = -1$$

$$x = (-1)$$

$$= x + 1$$

pg. 283 #14

$(0s, 2000m)$

2000m

$(40s, 0m)$

$h = \text{height (m)}$

$t = \text{time (s)}$

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

① put in the vertex  $y = a(x-20)^2 + 2000$

② put in  $(x, y)$  from another point use  $(0, 0)$   
 $0 = a(0-20)^2 + 2000$

use of these points to determine 'a'

Vertex  $(20s, 2000m)$   
time  $x$  height  $y$

20

2000m

40s

with left

$= -1$

$(-1)$

$(+1)$

$+ 2000$

use  $(x, y)$

$+ 2000$

③ Solve for 'a'

$$0 = a(0-20)^2 + 2000$$

$$0 = a(-20)^2 + 2000$$

$$0 = 400a + 2000$$

$$0 - 2000 = 400a$$

$$-2000 = 400a$$

$$\frac{-2000}{400} = a$$

$$-5 = a$$

④ Write the equation in vertex form

$$y = -5(x-20)^2 + 2000$$

Work pgs 280-283

#1-3, 5, 6 and 8<sup>13</sup>

Read Sec. 5.5

Pg 285-292

Quiz Tuesday

Sec. 5.1-5.4