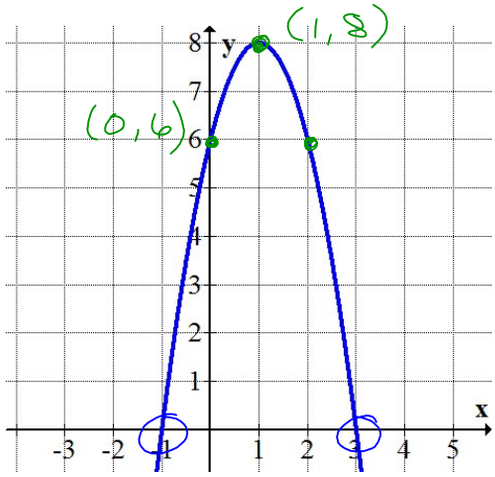
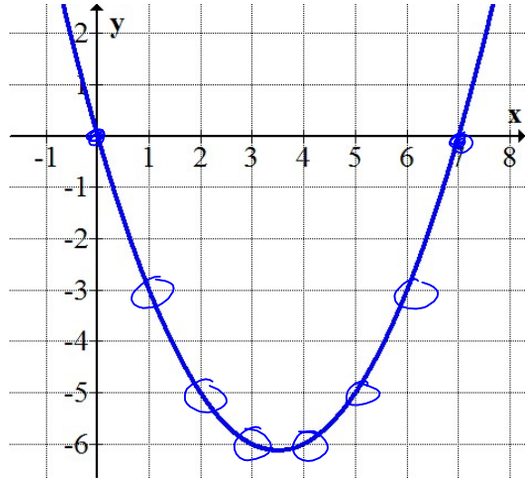
3.7 Creating Quadratic Equations

Ex. 1 Determine the equation of the parabola in factored form.

a)



b)



x-ints: -1 , 3

$(-1,0)$ & $(3,0)$

$y = a(x-r)(x-s)$

x-ints: $(0,0)$ & $(7,0)$

$= 0$, 7

Sub in

$y = a(x+1)(x-3)$

Sub in $(0,6)$

$6 = a(0+1)(0-3)$

$6 = a(1)(-3)$

$6 = a(-3)$

$-2 = a$

$\therefore y = -2(x+1)(x-3)$

$y = a(x-0)(x-7)$

$y = ax(x-7)$

Sub in $(1,-3)$

$-3 = a(1)(1-7)$

$-3 = a(-6)$

$\frac{-3}{-6} = a$

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

$\therefore y = \frac{1}{2}x(x-7)$

Oct 7-2:11 PM



2) Find the equation of a parabola that has:

a) vertex at (-2,5) and goes through (1,-3)

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

Use $V(-2,5)$

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

Sub $(1,-3)$

$-3 = a(1+2)^2 + 5$

$-3 = a(3)^2 + 5$

$-8 = a(9)$

$-\frac{8}{9} = a$

$\therefore y = -\frac{8}{9}(x+2)^2 + 5$

$a = -2$

b) stretch factor of 2, reflected about the x-axis, equation of the axis of symmetry x = 3 and goes through the point (2,5)

Vertex $(3, ?)$

k

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

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

Sub in $(2,5)$

$5 = -2(2-3)^2 + k$

$5 = -2(1) + k$

$5 = -2 + k$

$7 = k$

$\therefore y = -2(x-3)^2 + 7$

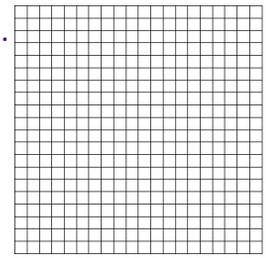
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Strategies?

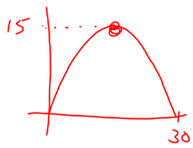
1) Find the equation of a parabola in vertex form that has:
   a) vertex at (-3, 2) and goes through (-1, 14)
   b) vertex at (5, -3) and goes through (1, -8)
   c) vertex at (2, 0) and goes through (5, 9)

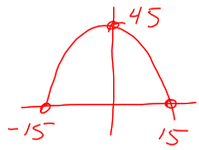
Vertex Form → Sub in Vertex → Sub in pt. → Solve for a

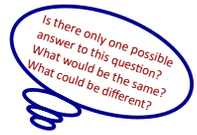
2) Sketch each parabola, then determine its equation. determine the value of 'a'.



   a) The parabola is 30 metres wide and reaches a maximum height of 45 metres.







   b) The parabola starts at the highest point of 30 m. It drops to zero 9 metres to the right of the highest point.



Vertex Form → (0, 30) as vertex
→ Sub in (9, 0)
→ Solve for a

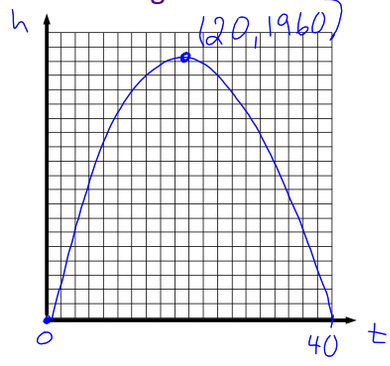
3) A bullet is launched from ground level and reaches a maximum height of 1960 feet after 20 seconds.

   a) Write an equation to model this situation. Find "a" algebraically.

   b) When does the bullet hit the ground?

   c) What is the projectile's height after 10 seconds? At what other time does it reach the same height?

↳ c) take equation
Sub $t = 10$



Oct 7-1:44 PM

Practice:

Set 1: p. 186 #7b,8,9,10a,18

Set 2: p. 186 #8,9,10,13,15,18