2.10 Real World Problem Solving using Graphing and Factoring

ZEROS WARMUP

We use several words to describe the x - intercepts of Quadratics:

- x intercepts
- Solution
- Roots

AND

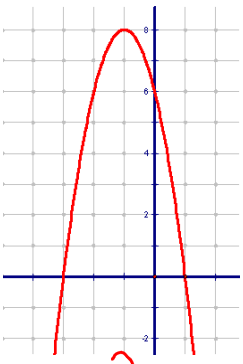
- Zeros

They all mean the same thing !!!!

the point where curve crosses x axis

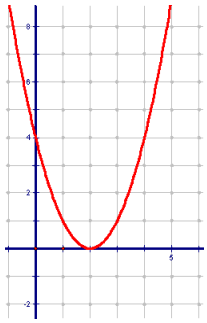
Ex 1: Given the graph, state the x intercepts of each of the quadratic functions

a)



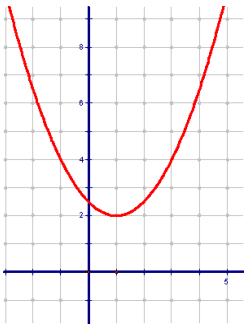
Zeros: 2

b)



Solution: 1

c)



Roots: 0

Ex 2: Given the equation, state the x intercepts of each of the quadratic function

$y=3(x+2)(x-5)$

$x=-2$ $x=5$

$y=3x(x-2)$

$x=0$ $x=2$

Nov 15-1:09 PM

Graphing from Factored Form

Ex 3: Graph the parabola defined by $y = -2x^2 + 4x + 6$

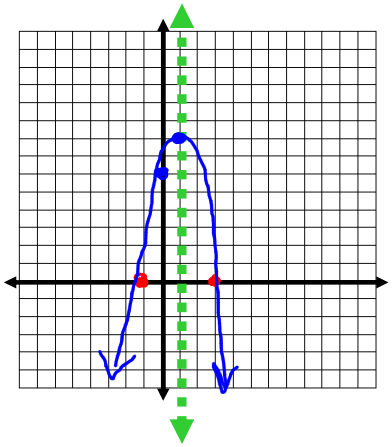
$= -2(x^2 - 2x - 3)$

$= -2(x-3)(x+1)$

M -3
A -2
N -3, 1

Step 1: Factor to find the x intercepts.

$x = 3$ & $x = -1$



Step 2: Find Vertex (halfway between zeroes)

- Find Axis of symmetry
- Sub in to find 'y' of vertex

A.O.S

$x = \frac{-1+3}{2}$

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

$x = 1$

Sub in $x = 1$

$y = -2(1-3)(1+1)$

$= -2(-2)(2)$

$= 8$

$V(1, 8)$

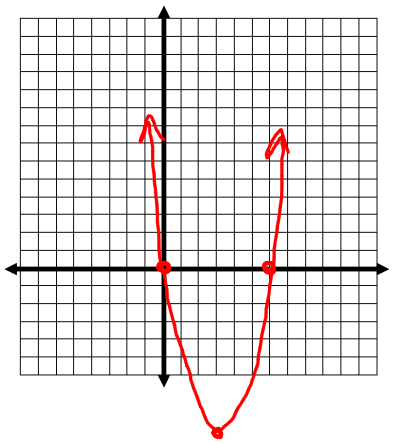
Ex 4: Graph the parabola defined by $y = x^2 - 6x$

$y = x(x-6)$

M 0
A -6
N 0, -6

Step 1: Factor to find the x intercepts.

$x = 0$ & $x = 6$



Step 2: Find Vertex (halfway between zeroes)

- Find AOS
- Sub in

A.O.S

$x = \frac{0+6}{2}$

$x = 3$

Sub in

$y = (3)^2 - 6(3)$

$y = 9 - 18$

$y = -9$

$V(3, -9)$

Real World Problem:

A diver jumps from a cliff. The height, h, in feet, t seconds after he jumps can be modelled by the equation: $h = -5t^2 + 20t + 160$

a) From what height does the diver jump?

160 feet

b) When does the diver hit the water?

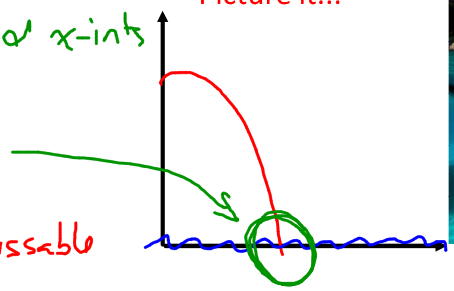
Must factor to find x-ints

$h = -5(t^2 - 4t - 32)$

$h = -5(t-8)(t+4)$

$t = 8$ & $t = -4$ Inadmissable

Picture it...



∴ Diver hit the water after 8s.

c) When does the diver reach their maximum height? What is the maximum h eight?

- Need vertex!
- Find AOS
- Sub in

AOS

$t = \frac{-4+8}{2}$

$t = 2$

Sub in t = 2

$h = -5(2-8)(2+4)$

$h = -5(-6)(6)$

$h = 30(6)$

$h = 180$

V (2, 180)

∴ He reached max of 180 feet at 2s

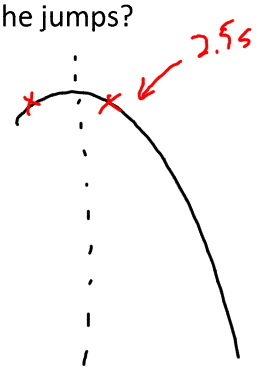
d) What is the height of the diver 1.5 seconds after he jumps? When is he at that height again?

SUB IN $t = 1.5$

$h = -5(1.5-8)(1.5+4)$

$= -5(-6.5)(5.5)$

$= 178.75$ feet



Homework:

1. Real world Handout
2. page. 272

Graph # 3b, 4c,5a

Do # 8ab, 9, 10, 11

Apr 12-3:30 PM