PreCalculus 11

Name________________
Date________________

4.1 Solving by Graphing

Linear equations have degree __1__ and have __1 or less solutions__.

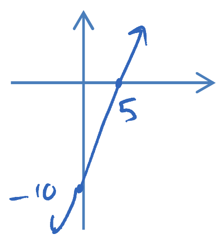
e.g. $2x - 10 = 0$

$2x = 10 \longrightarrow x = 5$

Linear functions have degree __1__ and have __1 or less x intercepts__.

e.g. $y = 2x - 10$

x int $= 5$
(i.e. where $y = 0$)



Link the Ideas: p. 208

- the root(s) of an equation are __the answers for the eq$^{\underline{n}}$__
- the root(s) of a function are __(x, y) points that satisfy the f$^{\underline{n}}$__
- the zeros(s) of a function are __the x intercepts of the f$^{\underline{n}}$, which turn out to be the roots of the eq$^{\underline{n}}$.__.

It then follows that a ***quadratic equation*** has degree __2__ and can have __2 or less answers__.

e.g. solve for x: $x^2 + x = 6$

$x = 2$? $\quad 2^2 + 2 = 6$ ✓

$x = 1$? $\quad 1 + 1 = 6$ ✗

$x = 3$? $\quad 9 + 3 = 6$ ✗

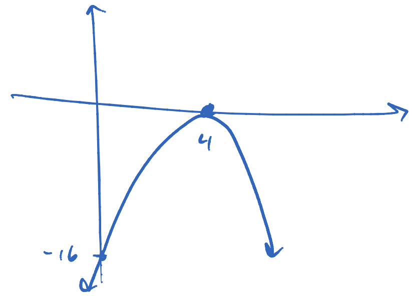
$x = -3$? $\quad 9 + -3 = 6$ ✓

2 an -3
both work!

We have studied ***quadratic functions***, and as stated above, the __roots__ of the ***quadratic equation*** should be the __zeros__ of the ***quadratic function.***

Example 1: p. 208 - What are the roots of the equation $-x^2 + 8x - 16 = 0$?

graph $-x^2+8x-16=y$



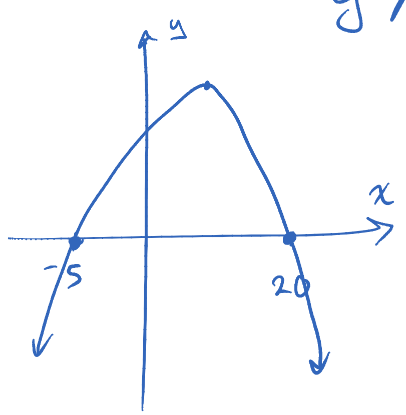
only hits x axis at $x=4$, so only answer is $x=4$

Example 2: p. 210 If the function $R(x) = 100 + 15x - x^2$ gives the store's revenue from dress sales, what price changes will result in no revenue?

i.e. $R(x)=0$

so... $0 = 100 + 15x - x^2$

graph $y = 100 + 15x - x^2$



$x = -5$ or $+20$

Hits x-axis twice, so two answers.

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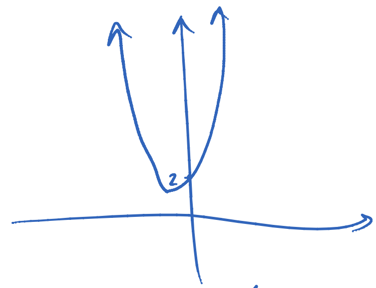
Example 3: - p. 212 Solve $2x^2 + x = -2$ by graphing

$$2x^2 + x + 2 = 0 \longrightarrow \text{graph function}$$

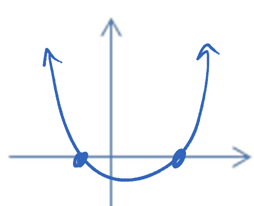
$$2x^2 + x + 2 = y$$



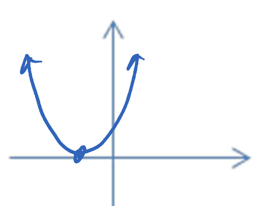
No x intercepts, so No answers!

Key Ideas:

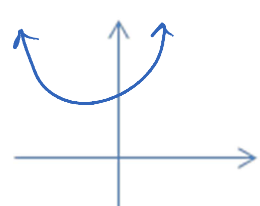
- The __roots__ of a quadratic equation are the __zeros__ of the corresponding quadratic function.
- The graph of a quadratic function can have __2, 1 or No__ real x-intercepts. Therefore the corresponding quadratic equation may have __2, 1 or No Real Answers__.



2 Real Zeros



1 Real Zero



No Real Zeros

Assignment: p. 215 # 1, 3, 5, 7, 10, 13