

QUADRATIC RELATIONS: Standard & Factored Form

Date: Notes

Standard Form: The standard form $y = ax^2 + bx + c$, tells us the y-intercept

Finding the y-intercept

Example:

$$y = 7x^2 + 2x - 5$$

Solution

Let $x = 0$, then solve for y

$$\begin{aligned} y &= 7x^2 + 2x - 5 \\ y &= 7(0)^2 + 2(0) - 5 \\ y &= 7(0) + 2(0) - 5 \\ y &= 0 + 0 - 5 \\ y &= -5 \end{aligned} \quad \therefore \text{y-intercept is } -5$$

What's an easier way to find the y-intercept?

It is the value of c. $y = 7x^2 + 2x - \underline{5}$

YOU TRY! Find the y-intercept for the following equations in Standard Form

a) $y = 11x^2 - 6x - 15$

y-int = -15

b) $y = x^2 + 13x + 4$

y-int = 4

c) $y = -6x^2 + 10x - 8$

y-int = -8

Factored Form: The factored form $y = (x-r)(x-s)$ tells us the x-intercepts (zeros)

Steps to Find the Zeros:

1. Change the equation from standard form, to factored form by factoring.

2. Factor by:

a. first try to common factor, then

b. factor using simple trinomial factoring or difference of squares.

3. Set $y = 0$

4. Solve for x

EXAMPLES: Find the zeros of the following equations

a) $y = x^2 - 8x - 33$

① $y = (x-11)(x+3)$

② $0 = (x-11)(x+3)$

③ $x-11=0$ $x+3=0$
 $x=11$ $x=-3$

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\therefore zeros are 11 & -3.

b) $y = 2x^2 + 6x - 80$

① $y = 2(x^2 + 3x - 40)$

$y = 2(x+10)(x-4)$

② $0 = 2(x+10)(x-4)$

③ $x+10=0$ $x-4=0$
 $x=-10$ $x=4$

\therefore zeros are -10 & 4.

c) $y = 3x^2 - 48$

① $y = 3(x^2 - 4)$

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

② $0 = 3(x-2)(x+2)$

③ $x-2=0$ $x+2=0$
 $x=2$ $x=-2$

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\therefore zeros are 2, -2