

Topic: 3.3 Zeros

Essential Question: How do you find and use zeros of a polynomial function?

Real Zeros of Polynomials:

If f is a polynomial function and a is a real number, the following statements are equivalent.

- 1) x-intercepts $(a, 0)$ 2) zeros $x = a$ 3) factor $(x - a)$ 4) Solution $x = a$

→ Ex1: Let's say our zeros are $x = -2, 1$ and 3 . Write the standard form for that function.

$$y = (x+2)(x-1)(x-3) = (x+2)(x^2 - 3x - 1x + 3) = (x+2)(x^2 - 4x + 3)$$

$$= x^3 - 4x^2 + 3x + 2x^2 - 8x + 6 = x^3 - 2x^2 - 5x + 6$$

Ex2: Find the zeros:

a) $f(x) = 3x^2 - 12x + 3$

b) $f(x) = -2x^3 + 6x^2 - 4.5x$

Solve by factoring or Quadratic Formula

$$x^3 - 4x^2 + 3x + 2x^2 - 8x + 6 = x^3 - 2x^2 - 5x + 6$$

Multiplicity: The number of times a factor occurs in a polynomial function.

Ex3: Tell the degree and find the zeros for the function:

a) $f(x) = (x - 2)^3(x + 2)$

b) $f(x) = (x - 2)^2(x + 2)$

$x = 2$ (mult. 3)

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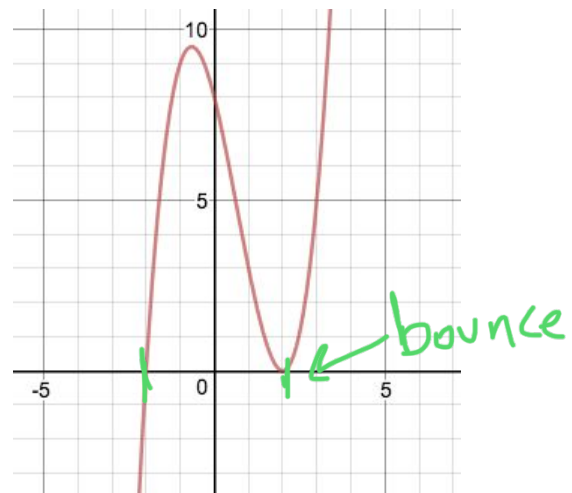
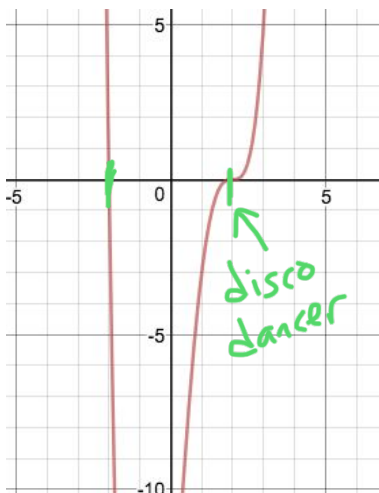
$x = -2$ Degree: 4

$x = -2$

$f(x) = (x-2)(x-2)(x-2)(x+2)$ Degree: quartic

Degree: 3 cubic

Now look at their graphs. What does the multiplicity look like?



Summary: