4.2: Graphing Polynomials from Factored Form

Upcoming Assessments:

- 4.1-4.4 Quiz- 11/3
- Unit 4 Test- 11/11

Homework: 4.2 Worksheet

Target(s): I can...

- determine the graph's behavior at an x-intercept using root multiplicity.
- graph a polynomial from factored form.
- create a graph based on key characteristics.

Explore on Desmos:

- How many zeros (x-intercepts) does a graph have?
- What affects the behavior of x-intercepts (i.e. when does a graph bounce at an x-intercept and when does a graph cross at an x-intercept)?

Number of Zeros:

a function defined by a polynomial of degree *n* has at most *n* distinct zeros

Multiplicity:

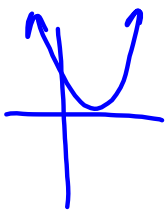
the number of times a zero is a solution of a polynomial function

Even Multiplicity: graph will bounce

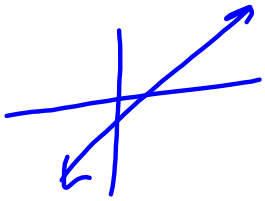
Odd Multiplicity: graph will cross

$(x-1)^2 = 0$

$x = 1$



$x - 1 = 0$



Example 1:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x)=(x+1)(x-2)(x-4)$

$x=-1$ m 1 → c

$x=2$ m 1 → c

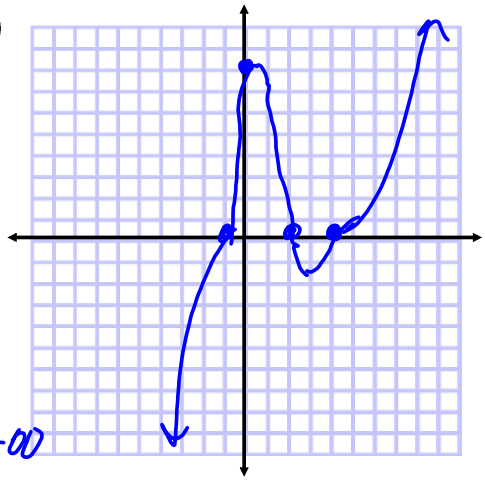
$x=4$ m 1 → c

3, ⊕

as $x \to -\infty$, $f(x) \to -\infty$

as $x \to \infty$, $f(x) \to \infty$

y-int: (0, 8)



Example 2:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x)=(x-1)^2$

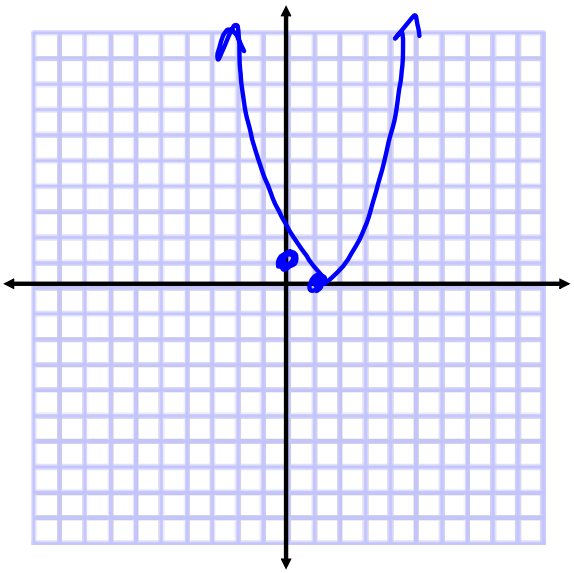
$x=1$ m 2 → b

2, ⊕ c

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to \infty$

y-int: (0, 1)



Example 3:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x) = x^2(x-3) = x\,x(x-3)$

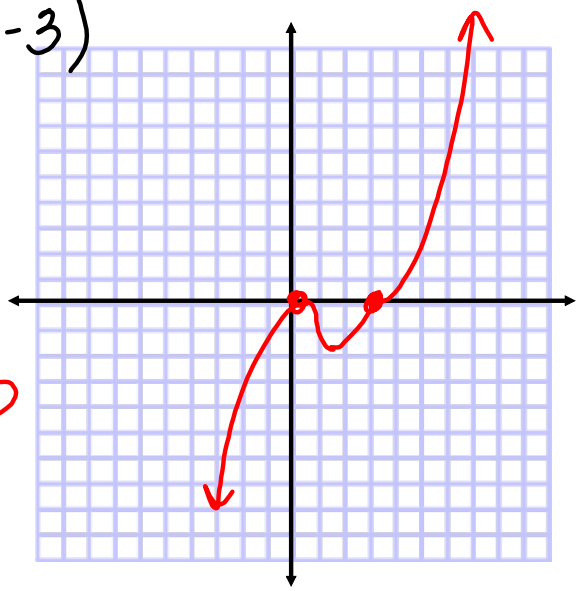
$x = 0$ m2 → b

$x = 3$ m1 → C

3, +

as $x \to -\infty$, $f(x) \to -\infty$

as $x \to \infty$, $f(x) \to \infty$



Example 4:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x) = 6x^3(x+4)$

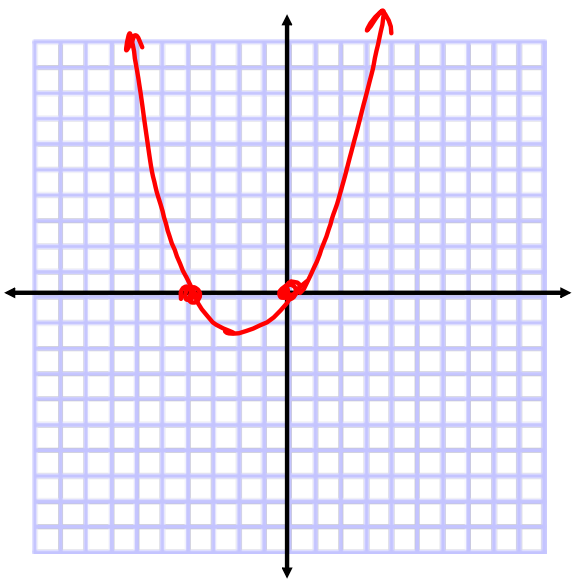
$x = 0$ m3 → C

$x = -4$ m1 → C

4, +

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to \infty$



Example 5:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x) = -4x^2(x+2)$

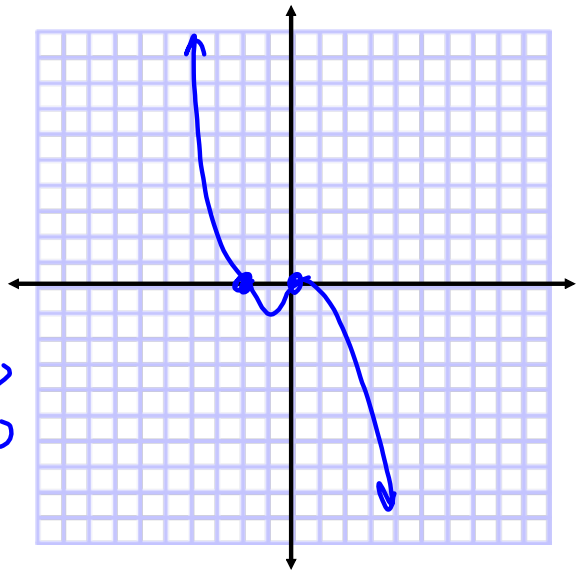
$x = 0$ m2 → b

$x = -2$ m1 → c

3, ⊖

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to -\infty$



Example 6:

For each polynomial function, determine all zeros and their multiplicities. Then graph the function (don't forget about end behavior!).

$f(x) = 4x - x^3$

$x(4 - x^2)$

$x(2-x)(2+x)$

$x = 0$

$x = 2$ m1 → c

$x = -2$

3, ⊖

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to -\infty$