Factored Form of a Polynomial Notes

Fresh: What is a real zero of a function?

- root, solution, x-intercept
- where graph crosses x-axis, $y = 0$

We call it a zero because...

- When $y = 0$ in equation.
  ex: $5x^2 - 3x + 2 = 0$

So to find the zeros of a factored polynomial, we need to set it equal to zero. Because we are multiplying each factor, we can set each factor equal to zero to tell us what points the entire function crosses the x-axis.

$f(x) = (x+3)(x-2) = 0$

$x+3=0 \qquad x-2=0$

$x = -3 \qquad x = 2$

$f(x) = x(x+4)(x-1) = 0$

$\boxed{x=0} \qquad x-1=0$

$x+4=0 \qquad \boxed{x=1}$

$\boxed{x = -4}$

$f(x) = (5x-2)(2x+3) = 0$

$5x-2=0 \qquad 2x+3=0$

$5x=2 \qquad 2x=-3$

$\boxed{x = \frac{2}{5}} \qquad \boxed{x = \frac{-3}{2}}$

Writing a polynomial in factored form from a graph.

(4,0)

(-1,0)
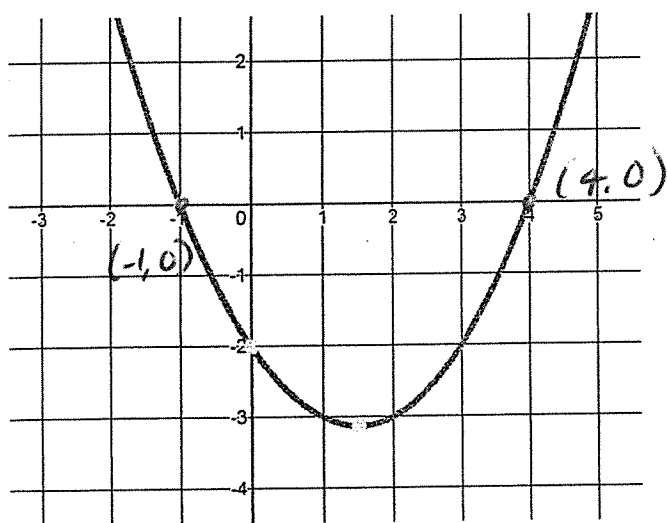
$x=-1 \qquad\qquad x=4$

$x+1=0 \qquad\qquad x-4=0$

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

(-3,0)

(4,0)

(-1,0)
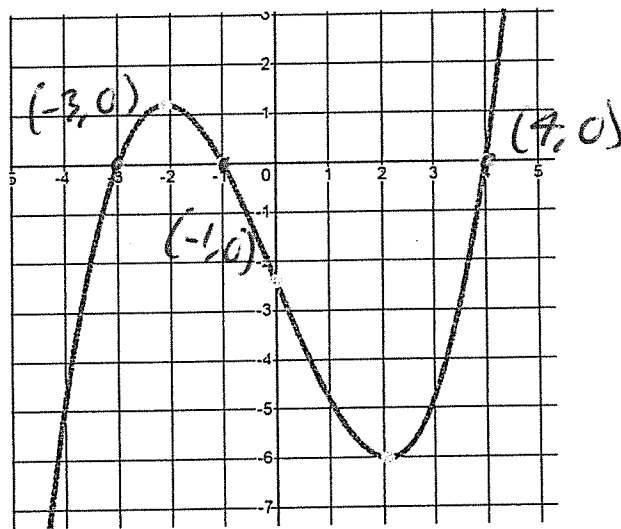
$x=-3 \qquad\qquad x=-1 \qquad\qquad x=4$

$x+3=0 \qquad\qquad x+1=0 \qquad\qquad x-4=0$

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

PRACTICE

What are the real zeros of the following polynomials?

1) $f(x) = (x+10)(x-7)$

2) $f(x) = x(x+9)(x+6)(x+1)$

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

4) $f(x) = x(7x+3)(5x-2)$

Write a polynomial in factored form that would represent the given graph.

6)

7)