Name _____ Class _____ Date _____

20.2 Connecting Intercepts and Linear Factors

→ x-intercept $y = 0$
↓ y-intercept $x = 0$

Essential Question: How are *x*-intercepts of a quadratic function and its linear factors related?

Resource Locker

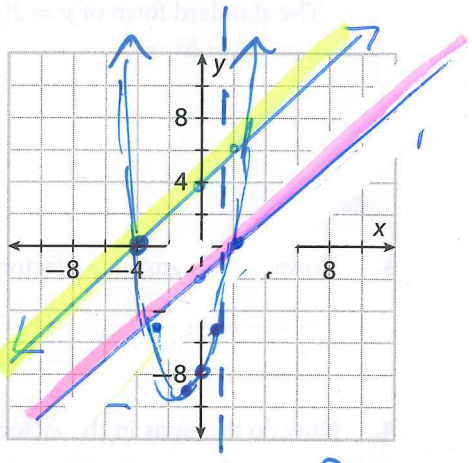
$(x+2)(x-3)$
factor factor
$x^2 - x - 6$ ← Product

Explore Connecting Factors and *x*–Intercepts

Use graphs and linear factors to find the *x*–intercepts of a parabola.

(A) Graph $y = x + 4$ and $y = x - 2$ using a graphing calculator. Then sketch the graphs on the grid.

m ↘ b ↙ m ↙ b



(B) Identify the *x*-intercept of each line. → zeros roots

The *x*-intercepts are -4 and 2.

(C) The quadratic function $y = (x + 4)(x - 2)$ is the product of the two linear factors that have been graphed. Use a graphing calculator to graph the function $y = (x + 4)(x - 2)$. Then sketch a graph of the quadratic function on the same grid with the linear factors that have been graphed.

$(-1, -9)$ Vertex

$y = (x+4)(x-2)$ factored form

(D) Identify the *x*-intercepts of the parabola.

The *x*-intercepts are -4 and 2.

Step #1 Find the avg. of −4 and +2 : it would be −1

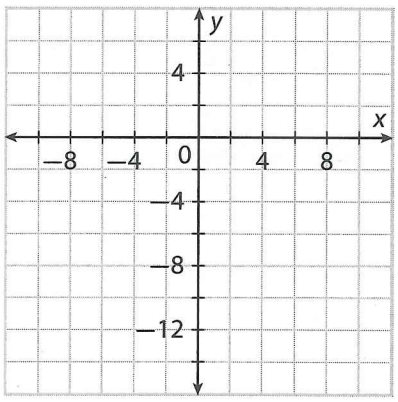
(E) What do you notice about the *x*–intercepts of the parabola?

Step #2 - Sub. x in equ. to find y-val of vertex

$y = (x+4)(x-2)$
$x + 4 = 0$ $\quad x - 2 = 0$
$x = -4$ $\quad x = 2$

Reflect

1. Use a graph to determine whether $2x^2 + 5x - 12$ is the product of the linear factors $2x - 3$ and $x + 4$.



2. **Discussion** Make a conjecture about the linear factors and *x*-intercepts of a quadratic function.

Evaluate: Homework and Practice

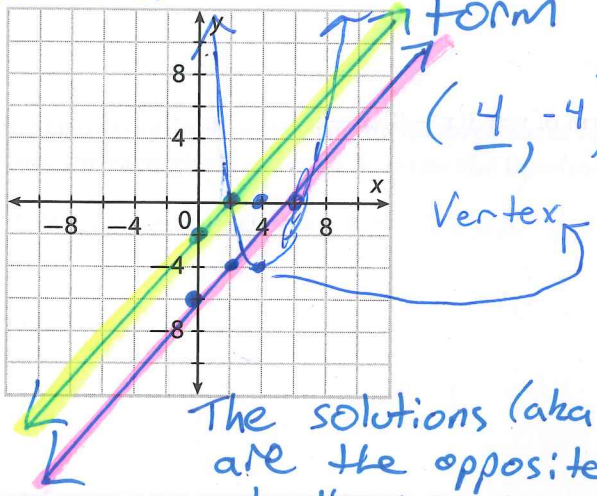
Personal Math Trainer

- Online Homework
- Hints and Help
- Extra Practice

Graph each quadratic function and each of its linear factors. Then identify the x-intercepts and the axis of symmetry of each parabola. pg 957

1. $y = (x - 2)(x - 6)$ m=1 b=-6 factored form

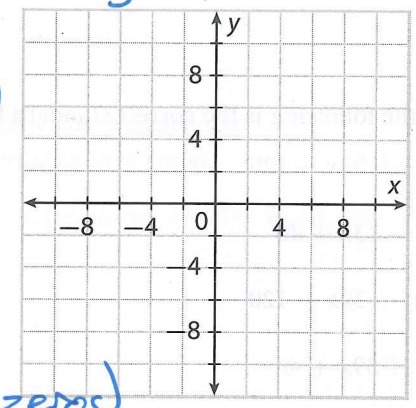
m=1 b=-2



(4, -4) Vertex

2. $y = (x + 3)(x - 1)$ "zeros" x-intercepts

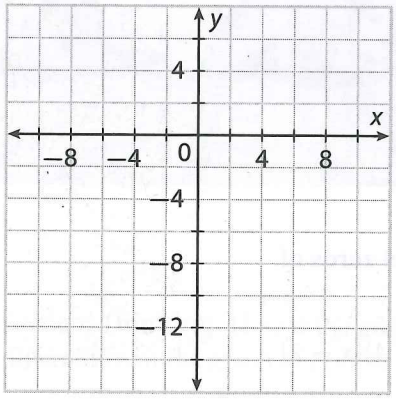
-3 +1



Hwork pg 957 # 1-4

The solutions (aka zeros) are the opposite of what's inside the ( )'s

3. $y = (x - 5)(x + 2)$



4. $y = (x - 5)(x - 5)$