

Starter

Get out your 2.7 packet and make sure your "Ready, Set, Go" homework is finished. We will go over any questions you have, and will be turning it in soon!

Topic: Factoring quadratics

$ax^2 + bx + c$

The area of a rectangle is given in the form of a trinomial expression. Find the equivalent expression that shows the lengths of the two sides of the rectangle.

~~$\begin{matrix} c \\ +b \\ -1 \end{matrix}$~~

9. $x^2 + 9x + 8 =$ $(x+8)(x+1)$	10. $x^2 - 6x + 8$ $(x-4)(x-2)$	11. $x^2 - 2x - 8$ $(x-4)(x+2)$	12. $x^2 + 7x - 8$ $(x+8)(x-1)$
13. $x^2 - 11x + 24$ $(x-8)(x-3)$	14. $x^2 - 14x + 24$ $(x-2)(x-12)$	15. $x^2 - 25x + 24$ $(x-1)(x-24)$	16. $x^2 - 10x + 24$ $(x-4)(x-6)$
17. $x^2 - 2x - 24$ $(x+4)(x-6)$	18. $x^2 - 5x - 24$ $(x-8)(x+3)$	19. $x^2 + 5x - 24$ $(x+8)(x-3)$	20. $x^2 - 10x + 25$
21. $x^2 - 25$ $x^2 + 0x - 25$	22. $x^2 - 2x - 15$	23. $x^2 + 10x - 75$	24. $x^2 - 20x + 51$
25. $x^2 + 14x - 32$	26. $x^2 - 1 =$ $x^2 + 0x - 1 =$ $(x+1)(x-1)$	27. $x^2 - 2x + 1$	28. $x^2 + 12x - 45$

~~$\begin{matrix} -1 \\ 0 \\ -1 \end{matrix}$~~

Finish 2.7

9. One customer had an unusual request. She wanted a block that is extended 2 inches on one side and decreased by 2 inches on the other. One of the employees thinks that this rectangle will have the same area as the original square since one side was decreased by the same amount as the other side was increased. What do you think? Use a diagram to find two expressions for the area of this block.

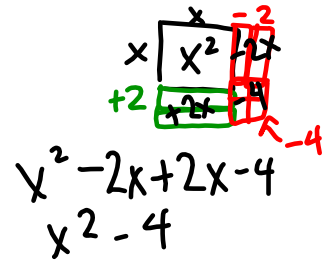
$$(x-2)(x+2) = x^2 + 2x - 2x - 4$$

$$x^2 - 4$$

$a=2$

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

$a^2 = 4$



10. The result of the unusual request made the employee curious. Is there a pattern or a way to predict the two expressions for area when one side is increased and the other side is decreased by the same number? Try modeling these two problems, look at your answer to #8, and see if you can find a pattern in the result.

a. $(x+1)(x-1) = x^2 - x + x - 1$

$a=1$

$$x^2 - 1$$

$a^2 = 1$

b. $(x+3)(x-3) = x^2 - 3x + 3x - 9$

$a=3$

$$x^2 - 9$$

$a^2 = 9$

11. What pattern did you notice? What is the result of $(x+a)(x-a)$?

b is 0, 0x,

$$x^2 - a^2 \rightarrow \text{difference of squares}$$

12. Some customers want both sides of the block reduced. Draw the diagram for the following blocks and find a trinomial expression for the area of each block. Use algebra to verify the trinomial expression that you found from the diagram.

a. $(x-2)(x-3) = x^2 - 3 - 2x + 6$

$$x^2 - 5x + 6$$

b. $(x+1)(x-4)$

$$x^2 - 3x - 4$$

13. Look back over all the equivalent expressions that you have written so far, and explain how to tell if the third term in the trinomial expression $ax^2 + bx + c$ will be positive or negative.

c will be positive if both factors are negative or both are positive.

c will be negative if one factor is positive and one is negative.

Hang onto

- colored packets (2.1 through 2.8)
- Chapter Summaries from textbook

2.8 Lining Up Quadratics

A Practice Understanding Task

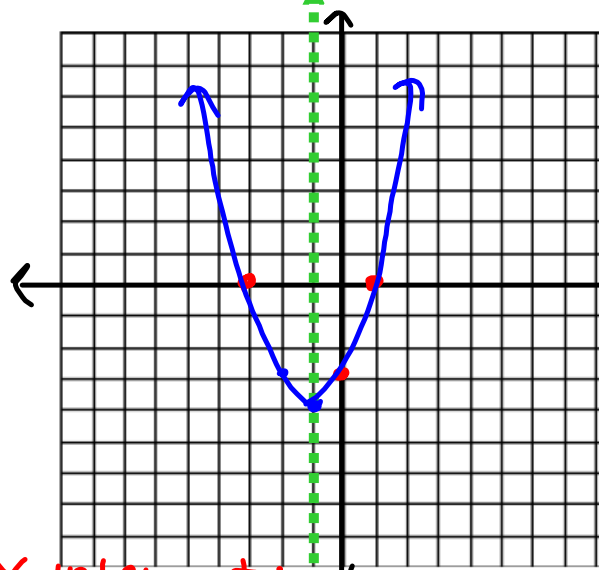
Graph each function and find the vertex, the y-intercept and the x-intercepts. Be sure to properly write the intercepts as points



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

factored form: $y = (x - d)(x - e)$

to find x-intercepts
make $y=0$
and solve for x .



Line of Symmetry $x = -1$

Vertex $(-1, -4)$

x-intercepts $(1, 0)$ $(-3, 0)$

y-intercept $(0, -3)$

$y = (-1 - 1)(-1 + 3)$
 $y = -2 \cdot 2$
 $y = -4$

to find y-intercepts:
make $x=0$
and solve for y

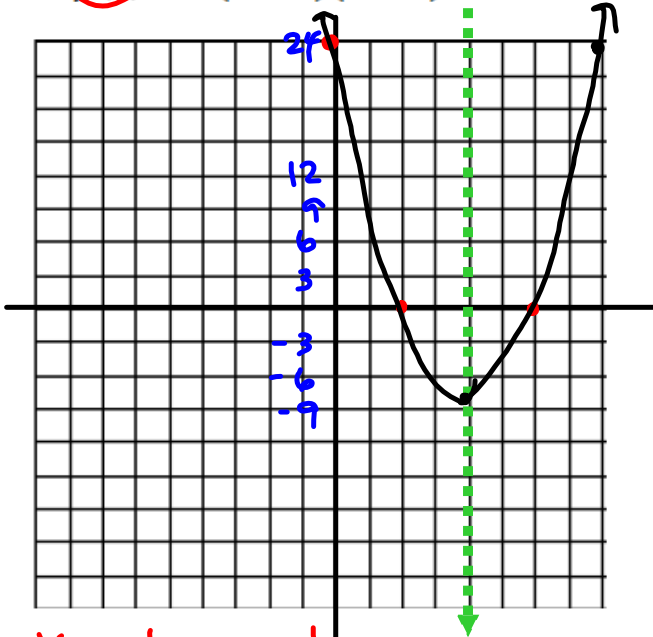
x-intercepts:
 $0 = (x - 1)(x + 3)$

$$\begin{array}{r} x - 1 = 0 \text{ and} \\ +1 \quad +1 \\ \hline x = 1 \end{array}$$

$$\begin{array}{r} x + 3 = 0 \\ -3 \quad -3 \\ \hline x = -3 \end{array}$$

y-intercepts:
 $y = (0 - 1)(0 + 3)$
 $y = -1 \cdot 3$
 $y = -3$

2. $f(x) = 2(x-2)(x-6)$

Line of Symmetry $x = 4$ Vertex $(4, -8)$ x-intercepts $(2, 0)$ $(6, 0)$ y-intercept $(0, 24)$

$$\begin{aligned} \text{y-intercept:} \\ f(x) &= 2(0-2)(0-6) \\ &= 2(-2)(-6) \\ &= 24 \end{aligned}$$

$$\begin{aligned} \text{vertex} \\ f(4) &= 2(4-2)(4-6) \\ &= 2(2)(-2) \\ &= -8 \end{aligned}$$

x-intercepts:

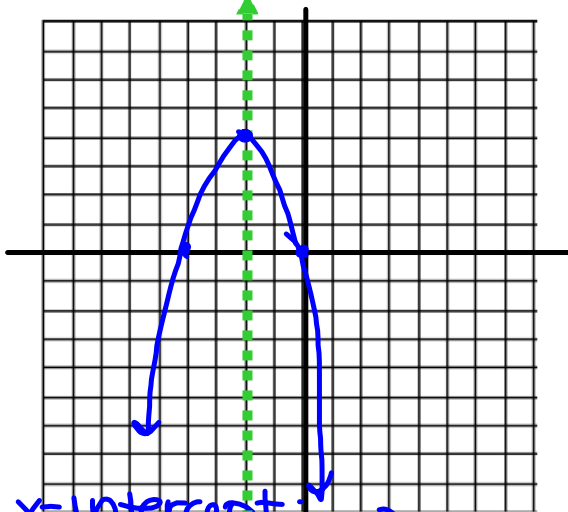
$$0 = \frac{2}{2} (x-2)(x-6)$$

$$0 = (x-2)(x-6)$$

$$\begin{array}{r} x-2=0 \\ +2 \quad +2 \\ \hline x=2 \end{array}$$

$$\begin{array}{r} x-6=0 \\ +6 \quad +6 \\ \hline x=6 \end{array}$$

3. $g(x) = -x(x + 4)$



x-intercept:
 $0 = -x(x+4)$

$$\begin{array}{r} x+4=0 \\ -4 \quad -4 \\ \hline x=-4 \end{array}$$

$$\begin{array}{r} x=0 \\ -1 \quad -1 \\ \hline x=0 \end{array}$$

Line of Symmetry $x = -2$

Vertex $(-2, 4)$

x-intercepts $(-4, 0)$ $(0, 0)$

y-intercept $(0, 0)$

$$\begin{aligned} f(-2) &= -(-2)(-2+4) \\ &= 2 \cdot 2 \\ &= 4 \end{aligned}$$

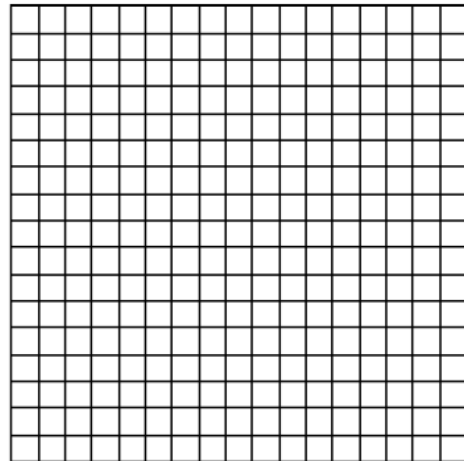
HW: # 4 on pg 47
 # 11-19 on pg. 51

4. Based on these examples, how can you use a quadratic function in factored form to:
- Find the line of symmetry of the parabola?
 - Find the vertex of the parabola?
 - Find the x-intercepts of the parabola?
 - Find the y-intercept of the parabola?
 - Find the vertical stretch?

5. Choose any two **linear** functions and write them in the form: $f(x) = m(x - c)$, where m is the slope of the line. Graph the two functions.

Linear function 1:

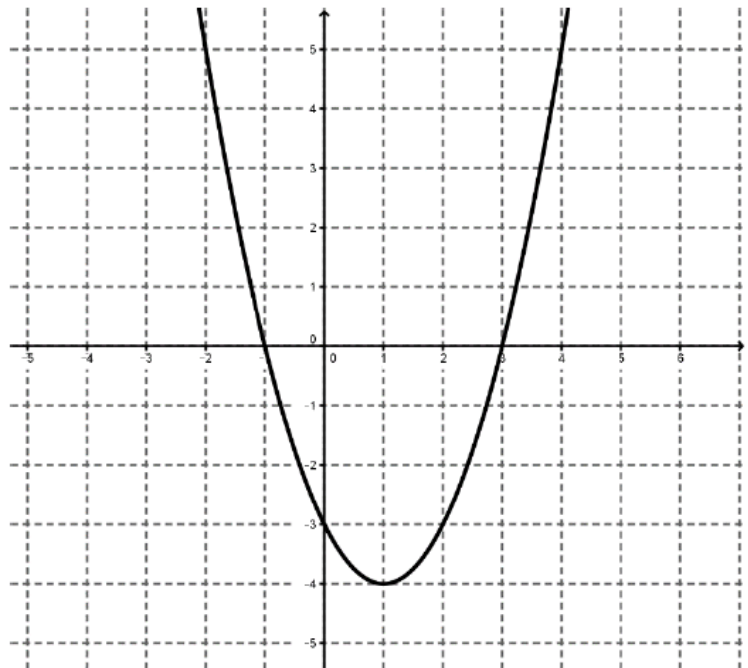
Linear function 2:



6. On the same graph as #5, graph the function $P(x)$ that is the product of the two linear functions that you have chosen. What shape is created?
7. Describe the relationship between x -intercepts of the linear functions and the x -intercepts of the function $P(x)$. Why does this relationship exist?

8. Describe the relationship between y -intercepts of the linear functions and the y -intercepts of the function $P(x)$. Why does this relationship exist?

9. Given the parabola to the right, sketch two lines that could represent its linear factors.



10. Write an equation for each of these two lines.

Homework

Finish 2.8 "Ready, Set, Go"