

Warm Up

6/1

Expand the following:

$$x(x - 6) \quad x^2 - 6x$$

$$(3 - x)(2 + x) \quad -x^2 + x + 6$$

Factor the following:

$$x^2 + 9x + 20 \quad (x+5)(x+4)$$

$$x^2 + 5x - 14 \quad (x-2)(x+7)$$

$$x^2 + 6x + 9 \quad (x+3)(x+3)$$
$$= (x+3)^2$$

How do we factor this?

$$16 - x^2$$

$$-x^2 + 16 = -x^2 + 0x + 16$$

$$-1(x^2 - 16)$$

a: -1
b: 0
c: 16
a·c: -16

Factors of -16	Sum = 0
1, -16	-15
2, -8	-6
4, -4	0
8, -2	6
16, -1	15

$$\begin{array}{c} x \\ 4 \end{array} \begin{array}{|c|c|} \hline -x^2 & 4x \\ \hline -4x & 16 \\ \hline \end{array} \begin{array}{c} x \\ 4 \end{array}$$

$$(x+4)(-x+4)$$

$$\begin{array}{c} x \\ 4 \end{array} \begin{array}{|c|c|} \hline x^2 & -4x \\ \hline 4x & -16 \\ \hline \end{array} \begin{array}{c} x \\ -4 \end{array}$$

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

Name _____

Homework Questions?

ate _____

Factoring Trinomials where $a > 1$

Factor each of the trinomials below. Use either the Box Method or Factor by Grouping. **You must write the expression with 4 terms BEFORE you begin to show your factoring work.**

1. $3x^2 - 7x - 6$

$$\begin{aligned} a: 3 \\ b: -7 \\ c: -6 \\ a \cdot c: -18 \end{aligned}$$

Factors of -18	Sum = -7
-1, 18	17
-2, 9	7
-3, 6	3
1, -18	-17
2, -9	-7
3, -6	-3

$3x^2 + 2x - 9x - 6$

x	$3x^2$	$2x$	$= -7$
-3	$-9x$	-6	
	$3x$	2	

$(3x+2)(x-3)$

2. $4x^2 - 15x + 9$

$$\begin{aligned} a: 4 \\ b: -15 \\ c: 9 \\ a \cdot c: 36 \end{aligned}$$

Factors of 36	Sum
1, 36	37
2, 18	20
3, 12	15
4, 9	13
6, 6	12
-3, -12	-15

$4x^2 - 3x - 12x + 9$

$4x$	$4x^2$	$-12x$	$= -15$
-3	$-3x$	9	
	x	-3	

$(4x-3)(x-3)$

3. $6x^2 - 5x - 6$

$$\begin{aligned} a: 6 \\ b: -5 \\ c: -6 \\ a \cdot c: -36 \end{aligned}$$

Factors of -36	Sum = -5
1, -36	-35
2, -18	-16
3, -12	-9
4, -9	-5
6, -6	0

$6x^2 + 4x - 9x - 6$

$2x$	$6x^2$	$4x$	$= -5$
-3	$-9x$	-6	
	$3x$	2	

$(2x-3)(3x+2)$

4. $2x^2 - 7x - 4$

$$\begin{aligned} a: 2 \\ b: -7 \\ c: -4 \\ a \cdot c: -8 \end{aligned}$$

Factors of -8	Sum = -7
-1, 8	7
-2, 4	2
1, -8	-7
2, -4	-2

$2x^2 + x - 8x - 4$

x	$2x^2$	x	$= -7$
-4	$-8x$	-4	
	$2x$	1	

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

5. $7x^2 - 8x + 1$

a: 7
b: -8
c: 1
a.c: 7

Factors of	Sum = -8
1, 7	8
-1, -7	-8

$7x^2 - 8x + 1$

x	$7x^2$	$-1x$	= -8
1	$-7x$	1	
	$7x$	-1	

$(x+1)(7x-1)$

6. $4x^2 - x - 5$

a: 4
b: -1
c: -5
a.c: -20

Factors of -20	Sum = -1
-1, 20	19
-2, 10	8
-4, 5	1
4, -5	-1

$4x^2 - 5x + 4x - 5$

x	$4x^2$	$-5x$	= -1
1	$4x$	-5	
	$4x$	-5	

$(4x-5)(x+1)$

7. $2x^2 + 7x + 3$

a: 2
b: 7
c: 3
a.c: 6

Factors of 6	Sum = 7
1, 6	7
2, 3	5
-1, -6	-7
-2, -3	-5

$2x^2 + x + 6x + 3$

x	$2x^2$	x	= 7x
3	$6x$	3	
	$2x$	1	

$(2x+1)(x+3)$

8. $6x^2 - x - 2$

a: 6
b: -1
c: -2
a.c: -12

Factors of -12	Sum = -1
-1, 12	11
-2, 6	4
-3, 4	1
-4, 3	-1
-6, 2	-4
-12, 1	-11

$6x^2 - 4x + 3x - 2$

2x	$6x^2$	$-4x$	= -1
1	$3x$	-2	
	$3x$	-2	

$(2x+1)(3x-2)$

9. $8x^2 + 10x - 3$

a: 8
b: 10
c: -3
a.c: -24

Factors of -24	Sum = 10
-1, 24	23
-2, 12	10
-3, 8	5
-4, 6	2

$8x^2 + 12x - 2x - 3$

2x	$8x^2$	$-2x$	= 10x
3	$12x$	-3	
	$4x$	-1	

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

10. $4x^2 + 16x + 15$

a: 4
b: 16
c: 15
a.c: 60

Factors of 60	Sum = 16
1, 60	61
2, 30	32
3, 20	23
4, 15	19
5, 12	17
6, 10	16

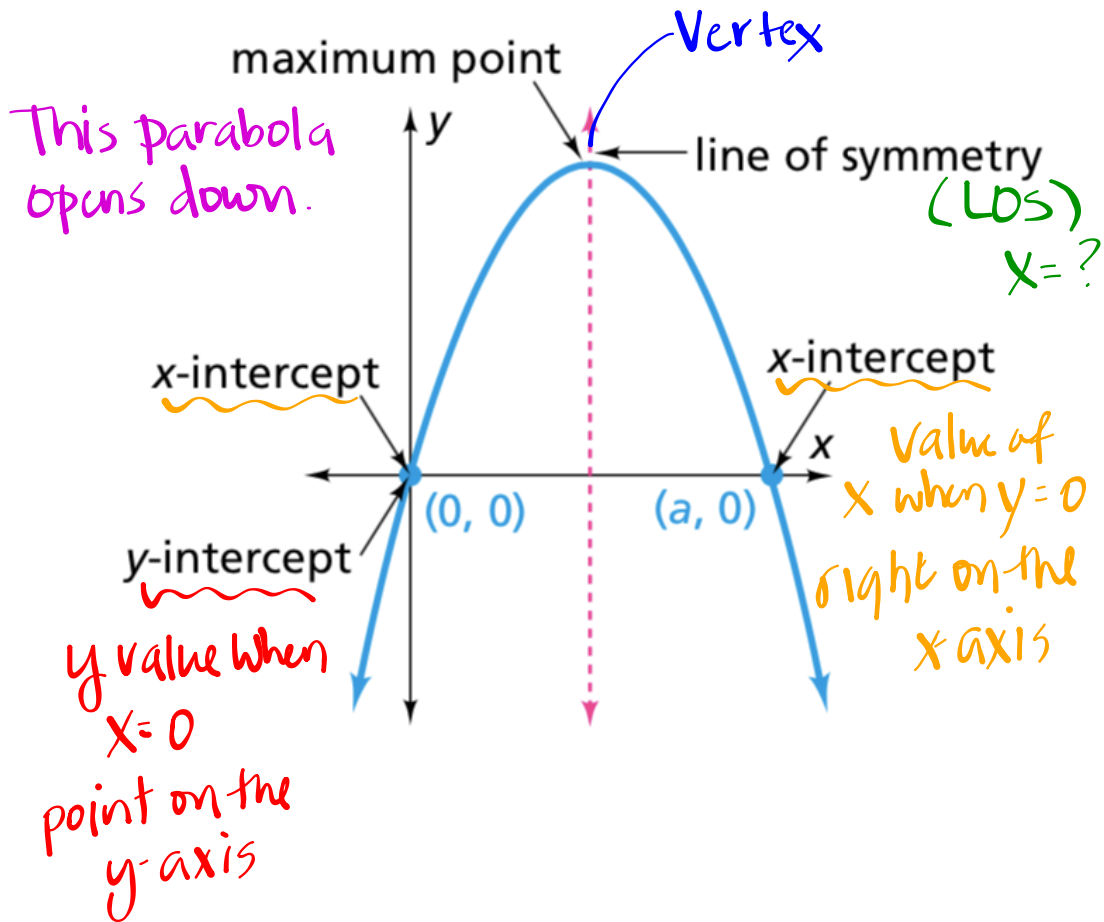
$4x^2 + 6x + 10x + 15$

2x	$4x^2$	$6x$	= 16x
5	$10x$	15	
	$2x$	3	

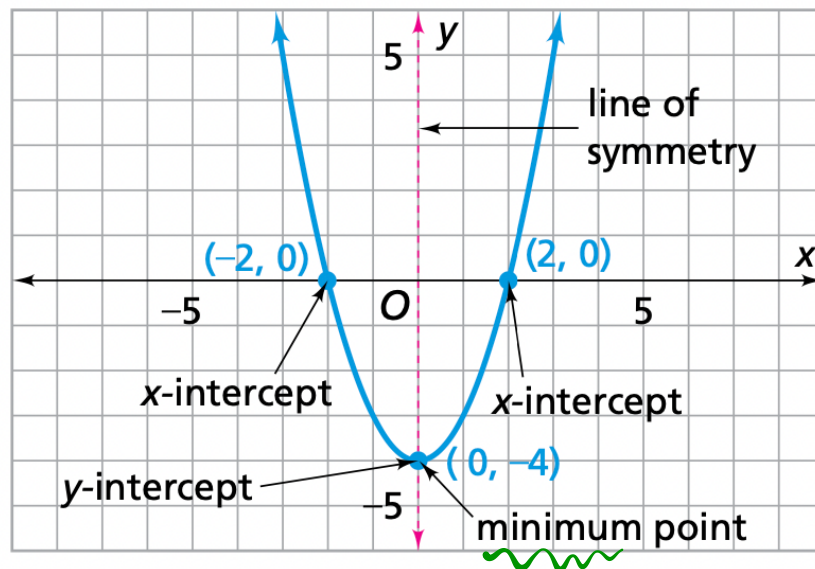
$(2x+5)(2x+3)$

Parabola Vocabulary

These are the Key Features



Same Key Features for a parabola opening up except we now have a **MINIMUM**.



Key Features of a Parabola:

Open up/down

x-intercepts

y-intercept

LOs (line of symmetry)

vertex

Complete Problem 2.4 A and B

Problem 2.4

A

- Graph each equation using Desmos.
- Complete the table provided for each graph.
- While in Desmos, you can hover over points to find the coordinates!

1. $y = x(x - 6)$

3. $y = x^2 + 6x + 9$

5. $y = x^2 + 5x - 14$

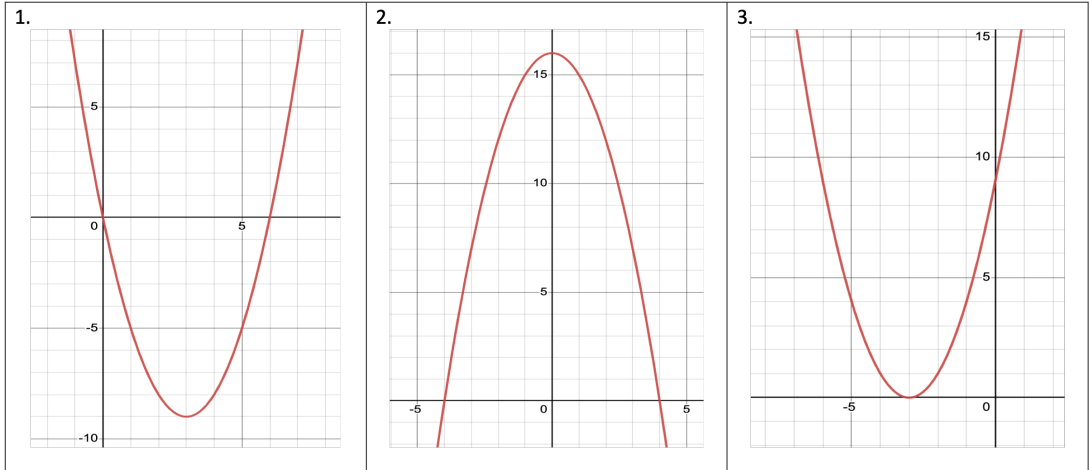
2. $y = 16 - x^2$

4. $y = x^2 + 9x + 20$

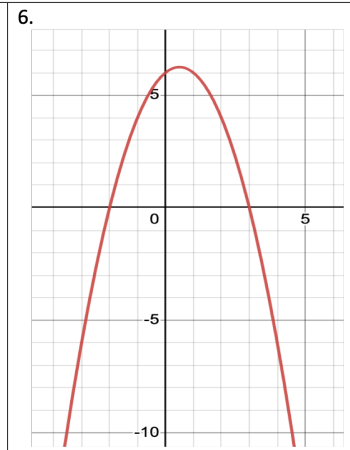
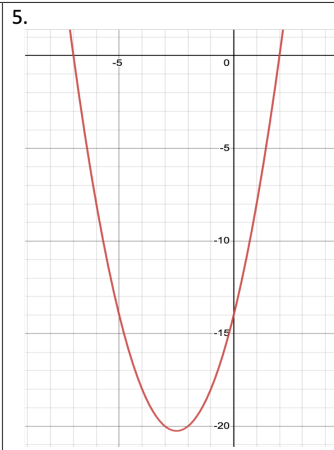
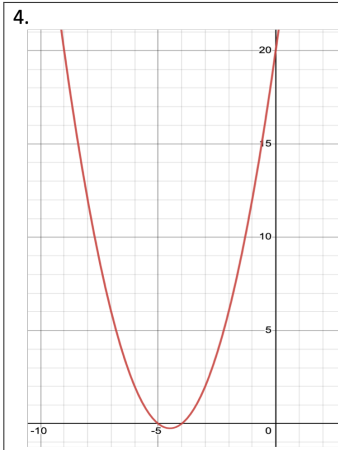
6. $y = (3 - x)(2 + x)$

Are you beginning to notice patterns between equations and key features?

Problem 2.4 A



Factored Form	$y = x(x - 6)$	$(4 - x)(4 + x)$	$(x + 3)(x + 3)$
Expanded Form	$x^2 - 6x$	$y = 16 - x^2$	$y = x^2 + 6x + 9$
y-intercept			
x-intercept(s)			
Min/Max			
Line of Symmetry			
Opens Up/Down			



Factored Form	$(x+4)(x+5)$	$(x+7)(x-2)$	$y = (3-x)(2+x)$
Expanded Form	$y = x^2 + 9x + 20$	$y = x^2 + 5x - 14$	$-x^2 + x + 6$
y-intercept			
x-intercept(s)			
Min/Max			
Line of Symmetry			
Opens Up/Down			

Use what you learned in Part A to complete this.

*Use equations in both expanded
and factored forms!*

- B** Without graphing, describe the graph of each equation. Give as many details as possible.
- $y = x^2 + 8x + 12$
 - $y = (x + 3)(x - 3)$
 - $y = -x^2 + 6x$
 - Explain what features of the graph of a function, such as intercepts, maximum/minimum point, and line of symmetry, you can predict from an equation of the function. Describe how you can make these predictions.

Homework

Finish classwork