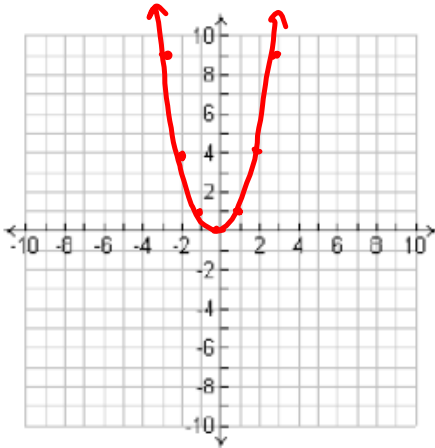# Module 2 Review Day

Today we are working on our Module 2 Study Guide to get ready for our test Wednesday. If you did not receive a study guide, the extras are in the green bucket.

Sep 13-2:10 PM

SECONDARY MATH II
Module 2 Study Guide: Structure of Expressions

<u>Directions</u>: Show ALL work and make sure to write clearly, graph your functions neatly, and label appropriately.

1. Graph $f(x) = x^2$.

Describe how the following functions have been transformed (translated, reflected, rotated, dilated) from $f(x) = x^2$.

2. $f(x) = -x^2$ *reflected across x-axis*

3. $f(x) = x^2 + 3$ *translated up 3*

4. $f(x) = 3x^2$ *dilated 3*

5. $f(x) = (x - 3)^2$ *translated right 3*

Identify a, b, and c using $f(x) = ax^2 + bx + c$.

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

a= *-2*
b= *3*
c= *2*
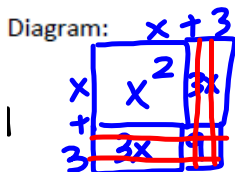
7. $f(x) = x^2 - 5x + 4$

a= *1*
b= *-5*
c= *4*

8. $f(x) = -x^2 + 8x - 9$

a= *-1*
b= *8*
c= *-9*

Are the following perfect squares? If so, draw the diagram for the expression and write the trinomial as a product of two binomials. If not, write what you would need to add or subtract to complete the square.
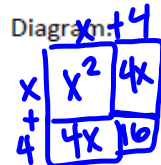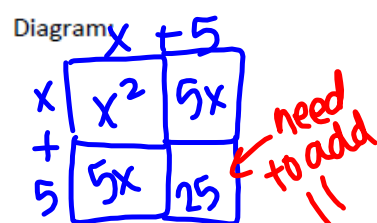
9. $f(x) = x^2 + 6x + 9$

Perfect square? *yes*

Diagram: *x + 3*

Product of binomials (side lengths): *(x+3)(x+3) = (x+3)²*

10. $f(x) = x^2 + 8x + 16$

Perfect square? *yes*

Diagram: *x + 4*

Product of binomials (side lengths): *(x+4)(x+4) = (x+4)²*

11. $f(x) = x^2 + 10x + 14$

Perfect square? *no*

Diagram: *x + 5*   *need to add 11*

Product of binomials (side lengths): *(x+5)(x+5) = 11*
(x+5)² - 11 = 0

Oct 17-9:29 AM

Multiply the following binomials. Use a diagram to help you.

12. $(x+4)(x+1)$

$x^2 + x + 4x + 4$

$\boxed{x^2 + 5x + 4}$

	x	$+4$
x	x^2	$4x$
$+1$	x	4

13. $(x+6)(x-2)$

$x^2 - 2x + 6x - 12$

$\boxed{x^2 + 4x - 12}$

	x	$+6$
x	x^2	$6x$
-2	$-2x$	-12

14. $(x-8)(x-5)$

$x^2 - 5x - 8x + 40$

$\boxed{x^2 - 13x + 40}$

	x	-8
x	x^2	$-8x$
-5	$-5x$	$+40$

Factor the following into a product of two binomials.

15. $x^2 + 9x + 18 =$
　　　　　　b　c
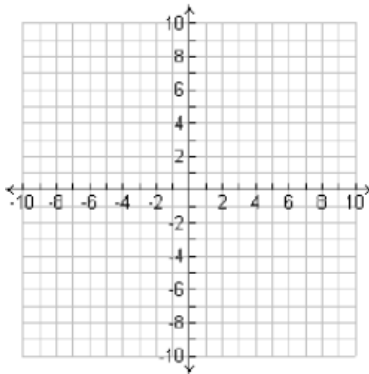
$(x+6)(x+3)$

16. $x^2 - 5x + 4 =$

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

$\cdot 4$	SUM
$1, 4$	$1 + 4 = 5$
$-1, -4$	$-1 + -4 = -5$
$-2, 2$	$-2 + -2 = -4$
$2, 2$	$2 + 2 = 4$

17. $x^2 + 2x - 15 =$

$(x+5)(x-3)$

Graph the following quadratic functions. Use a table of values or a graphing calculator to help you. Mark and label the axis of symmetry, the vertex, and two points on each side of the axis of symmetry.
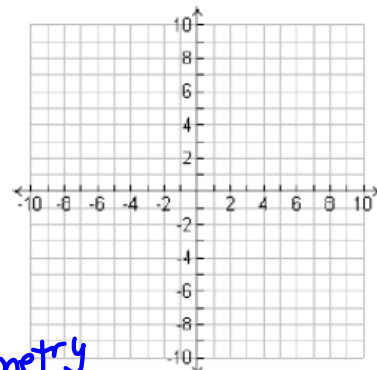
18. $f(x) = (x-1)(x+3)$

19. $f(x) = -(x+1)^2 + 4$
$\leftarrow 1 \uparrow 4$

x	y
-2	$-(-2+1)^2 + 4 = 3$
-3	$-(-3+1)^2 + 4 = 0$
0	$-(0+1)^2 + 4 = 3$

$x = -1$ axis of symmetry

20. $f(x) = x^2 - x - 12$

Complete the square and get the following into vertex form, $f(x) = a(x-h)^2 + k$.

21. $f(x) = x^2 + 10x + 13$

	x	$+5$
x	x^2	$5x$
$+5$	$5x$	25

$x^2 + 10x + 13 + 12 = 0 + 12$

$x^2 + 10x + 25 = 12$

$(x+5)^2 = 12$
　　　-12　　-12
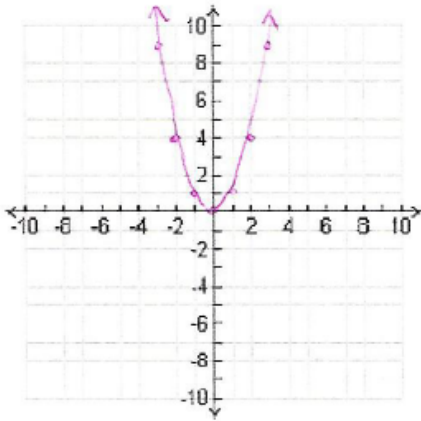
$(x+5)^2 - 12 = 0$

$f(x) = (x+5)^2 - 12$

22. $f(x) = 2x^2 - 4x + 6$

Sep 16-11:46 AM

SECONDARY MATH II
Module 2 Study Guide: Structure of Expressions

<u>Directions</u>: Show ALL work and make sure to write clearly, graph your functions neatly, and label appropriately.

1. Graph $f(x) = x^2$.

Describe how the following functions have been transformed (translated, reflected, rotated, dilated) from $f(x) = x^2$.

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

reflected across x-axis

3. $f(x) = x^2 + 3$

↑3

4. $f(x) = 3x^2$

dilated 3

5. $f(x) = (x-3)^2$

→3

Identify a, b, and c using $f(x) = ax^2 + bx + c$.

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

a= -2
b= 3
c= 2

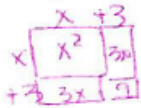7. $f(x) = x^2 - 5x + 4$

a= 1
b= -5
c= 4

8. $f(x) = -x^2 + 8x - 9$

a= -1
b= 8
c= -9

Are the following perfect squares? If so, draw the diagram for the expression and write the trinomial as a product of two binomials. If not, write what you would need to add or subtract to complete the square.

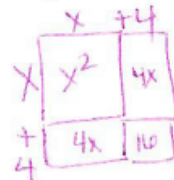9. $f(x) = x^2 + 6x + 9$

Perfect square? _yes_

Diagram:

10. $f(x) = x^2 + 8x + 16$

Perfect square? _yes_

Diagram:

11. $f(x) = x^2 + 10x + 14$

Perfect square? _no_

Diagram:

 need to add 11 more to get 25

Product of binomials (side lengths):
$(x+3)(x+3) = (x+3)^2$

Product of binomials (side lengths):
$(x+4)(x+4) = (x+4)$

Product of binomials (side lengths):
$(x+5)(x+5) = +11$
$(x+5)^2 = 11$
$(x+5)^2 - 11 = 0$

Multiply the following binomials. Use a diagram to help you.

12. $(x+4)(x+1)$

$x^2 + x + 4x + 4$

$x^2 + 5x + 4$

13. $(x+6)(x-2)$

$x^2 - 2x + 6x - 12$

$x^2 + 4x - 12$

14. $(x-8)(x-5)$

$x^2 - 5x - 8x + 40$

$x^2 - 13x + 40$

Factor the following into a product of two binomials.
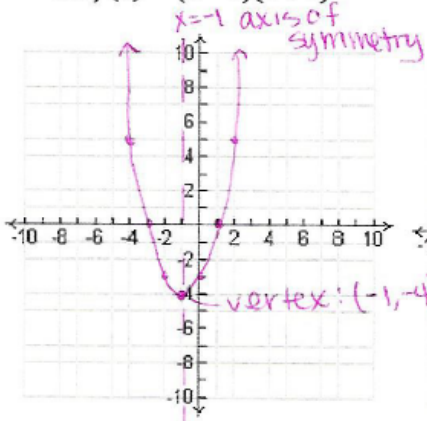
15. $x^2 + 9x + 18$

$(x+6)(x+3)$

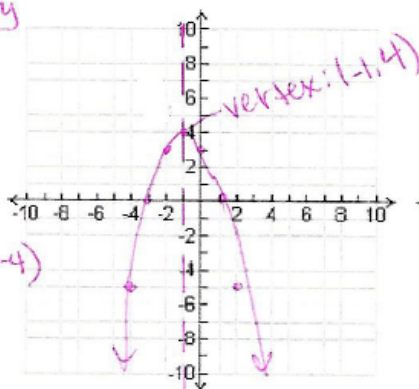16. $x^2 - 5x + 4$

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

17. $x^2 + 2x - 15$

$(x+5)(x-3)$

Graph the following quadratic functions. Use a table of values or a graphing calculator to help you. Mark and label the axis of symmetry, the vertex, and two points on each side of the axis of symmetry.
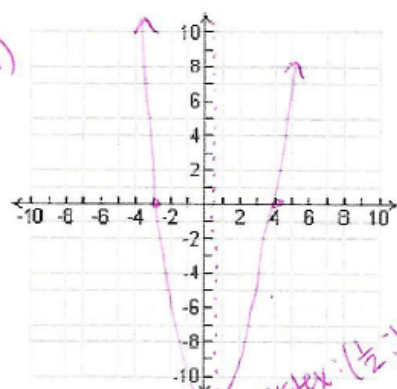
18. $f(x) = (x-1)(x+3)$

$x = -1$ axis of symmetry

vertex $(-1,-4)$

Vertex:
$x = \frac{-3+1}{2} = \frac{-2}{2} = -1$

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

19. $f(x) = -(x+1)^2 + 4$

vertex $(-1,4)$

$x = -1$ axis of symmetry

20. $f(x) = x^2 - x - 12 = (x-4)(x+3)$

vertex $(\frac{1}{2}, 12\frac{1}{4})$

$x = \frac{1}{2}$ axis of symmetry

need to subtract 2

Complete the square and get the following into vertex form, $f(x) = a(x-h)^2 + k$.

21. $f(x) = x^2 + 10x + 13$

$0 = x^2 + 10x + 13$
$+12 \qquad\qquad +12$
$= x^2 + 10x + 25$
$12 = x^2 + 10x + 25$
$12 = (x+5)(x+5)$
$\underset{-12}{} \qquad\qquad \underset{-12}{}$
$0 = (x+5)^2 - 12$
$f(x) = (x+5)^2 - 12$

22. $f(x) = 2x^2 - 4x + 6$

$0 = 2(x^2 - 2x + 3)$
$-4 = 2(x^2 - 2x + 3 - 2)$
$-4 = 2(x^2 - 2x + 1)$
$0 = 2(x-1)^2 + 4$
$f(x) = 2(x-1)^2 + 4$

Oct 17-9:32 AM

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