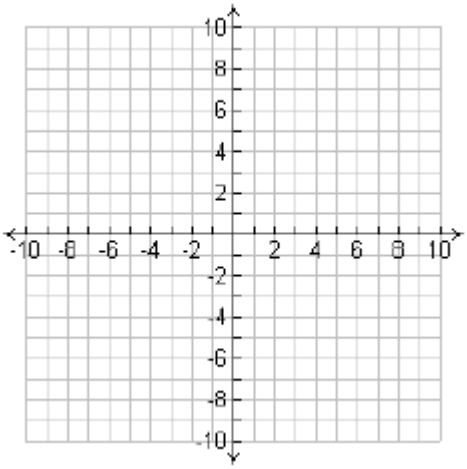
Name: _____
Date: _____ Period: _____

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

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

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

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

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

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

a= _____
b=_____
c=_____

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

a= _____
b=_____
c=_____

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

a= _____
b=_____
c=_____

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? _____

Diagram:

Product of binomials (side lengths):
_____

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

Perfect square? _____

Diagram:

Product of binomials (side lengths):
_____

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

Perfect square? _____

Diagram:

Product of binomials (side lengths):
_____

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

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

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

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

Factor the following into a product of two binomials.

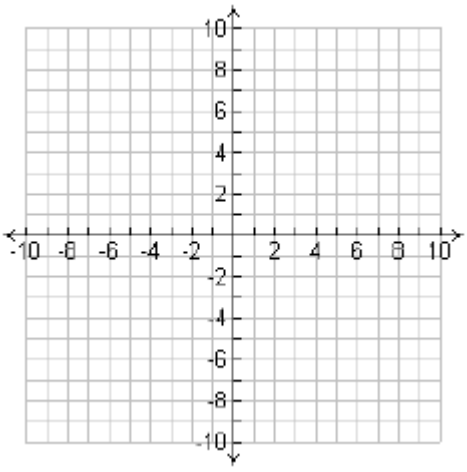
15. $x^2+9x+18$

16. x^2-5x+4

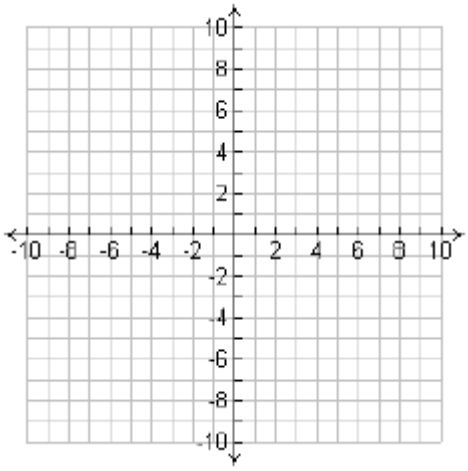
17. $x^2+2x-15$

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.

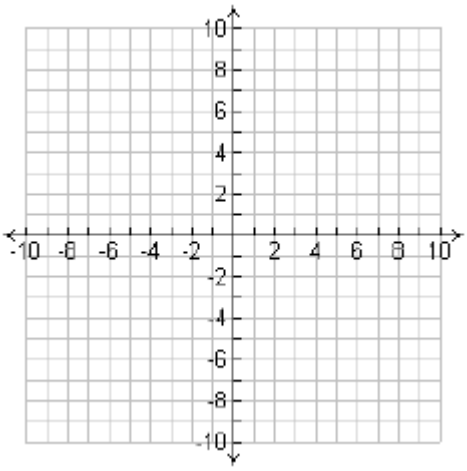
18. $f(x)=(x-1)(x+3)$



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



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



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

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

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