

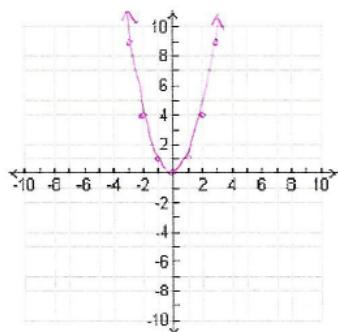
Module 2 Test Day

Get out your Module 2 Study Guides and check your answers!

SECONDARY MATH II
Module 2 Study Guide: Structure of Expressions

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

T3

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

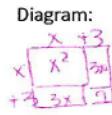
8. $f(x) = -x^2 + 8x - 9$

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.

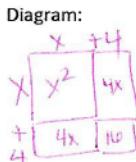
9. $f(x) = x^2 + 6x + 9$

Perfect square? yes



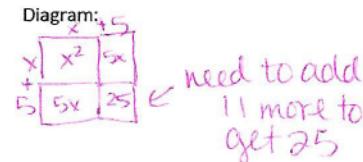
10. $f(x) = x^2 + 8x + 16$

Perfect square? yes



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

Perfect square? no



Product of binomials (side lengths):

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

Product of binomials (side lengths):

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

Product of binomials (side lengths):

$$(x+5)(x+5) = (x+5)^2$$

$$(x+5)^2 = 25$$

$$(x+5)^2 - 11 = 0$$

$$x^2 + 10x + 14 + 11 = 0$$

$$x^2 + 10x + 25 = 0$$

$$(x+5)(x+5) = 0$$

$$(x+5)^2 - 11 = 0$$

$$f(x) = (x+5)^2 - 11$$

$$\text{vertex: } (-5, -11)$$

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

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

$$\begin{array}{r} x^2 + x + 4x + 4 \\ \hline x^2 + 5x + 4 \\ \begin{array}{|c|c|c|} \hline & x^2 & x \\ \hline + & 4x & 4 \\ \hline & -2x & -12 \\ \hline \end{array} \end{array}$$

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

$$\begin{array}{r} x^2 - 2x + 6x - 12 \\ \hline x^2 + 4x - 12 \\ \begin{array}{|c|c|c|} \hline & x^2 & 6x \\ \hline - & 2x & -12 \\ \hline & -5x & 40 \\ \hline \end{array} \end{array}$$

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

$$\begin{array}{r} x^2 - 5x - 8x + 40 \\ \hline x^2 - 13x + 40 \\ \begin{array}{|c|c|c|} \hline & x^2 & -8x \\ \hline - & 5x & 40 \\ \hline & -5x & 40 \\ \hline \end{array} \end{array}$$

Factor the following into a product of two binomials.

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

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

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

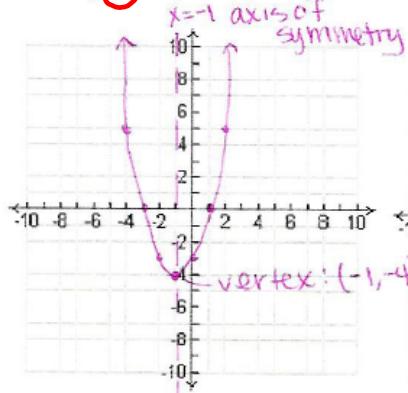
$$(x-4)(x-1)$$

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

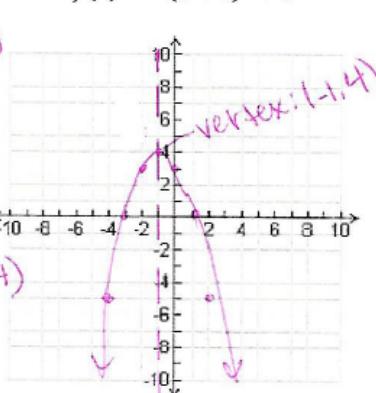
$$(x+5)(x-3)$$

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.

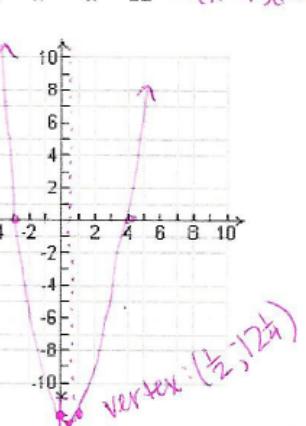
18. $f(x) = (x - 1)(x + 3)$



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



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



Vertex: $\frac{-3+1}{2} = \frac{-2}{2} = -1$ $y = (-1-1)(-1+3) = -2 = -4$ following

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

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

$$\begin{aligned} 0 &= x^2 + 10x + 13 \\ &\quad +12 \qquad +12 \\ 12 &= x^2 + 10x + 25 \\ 12 &= x^2 + 10x + 25 \end{aligned}$$

$$12 = (x+5)(x+5)$$

$$0 = (x+5)^2 - 12 \quad *OK$$

$$f(x) = (x+5)^2 - 12 \quad *OK$$

50 x 11.00 in

$$\begin{array}{|c|c|c|} \hline & x^2 & 5x \\ \hline + & 5x & 25 \\ \hline & -x & -12 \\ \hline \end{array}$$

Graph

$$\begin{array}{|c|c|c|} \hline & x^2 & -x \\ \hline - & -x & 1 \\ \hline & -x & -1 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline & x^2 & x \\ \hline - & -x & 1 \\ \hline & -x & -1 \\ \hline \end{array}$$