

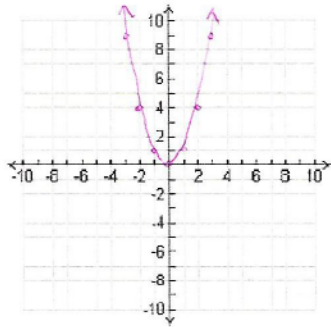
Module 2 Test Day

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

↑ 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 = $\frac{-2}{-}$
b = $\frac{3}{-}$
c = $\frac{2}{-}$

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

a = $\frac{1}{-}$
b = $\frac{-5}{-}$
c = $\frac{4}{-}$

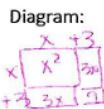
8. $f(x) = -x^2 + 8x - 9$

a = $\frac{-1}{-}$
b = $\frac{8}{-}$
c = $\frac{-9}{-}$

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



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

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

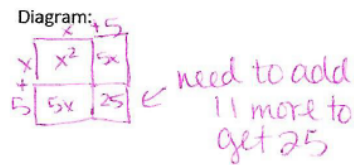
Perfect square? yes



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

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

Perfect square? no



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

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

$x^2 + 10x + 25 = 11$

$(x+5)(x+5) = 11$

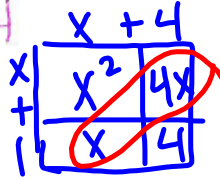
$(x+5)^2 = 11$

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

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

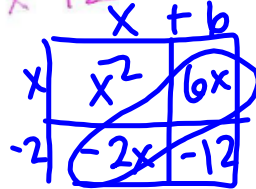
12. $(x+4)(x+1)$

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



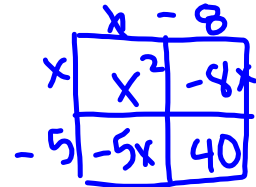
13. $(x+6)(x-2)$

$x^2 - 2x + 6x - 12$
 $x^2 + 4x - 12$



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. $x^2 - 5x + 4$

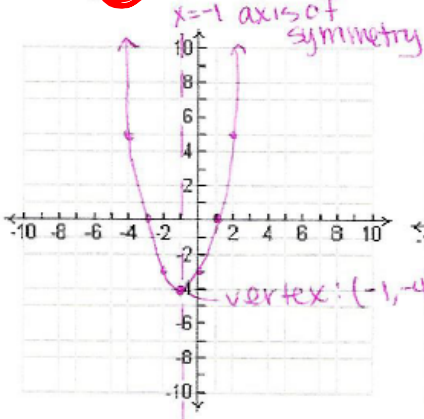
$(x-4)(x-1)$

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

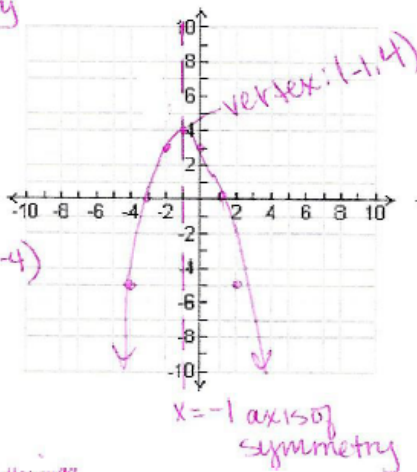
$(x+5)(x-3)$

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.

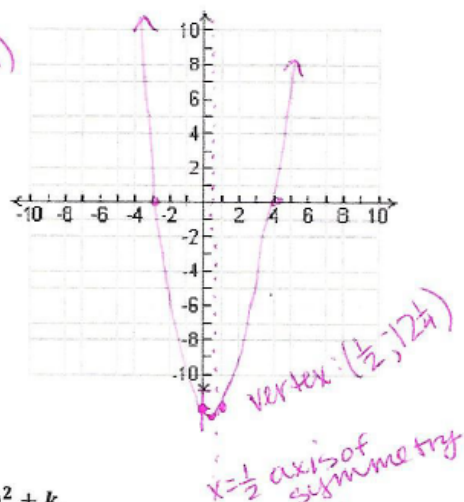
18. $f(x) = (x-1)(x+3)$



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



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



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

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

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

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

OK

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

$0 = 2(x^2 - 2x + 3)$
 $\frac{-4}{-4} = 2(x^2 - 2x + 3 - 2)$
 $\frac{-4}{-4} = 2(x^2 - 2x + 1)$
 $0 = 2(x-1)^2 + 4$
 $f(x) = 2(x-1)^2 + 4$

need to subtract 2

