

11.7.D1 – TRANSFORMATIONS OF QUADRATIC FUNCTIONS

Use a graphing calculator to determine the vertex AND zeros of each quadratic function. Then rewrite the function in vertex form AND factored form. Refer to the 11.6 example “Writing an Equation of a Parabola Given Information about its Graph” in the Chapter 11 Summary.

1. $f(x) = x^2 + 8x + 12$

- VERTEX:
- VERTEX FORM:
- ZEROS:
- FACTORED FORM:

2. $f(x) = -x^2 - 2x + 15$

- VERTEX:
- VERTEX FORM:
- ZEROS:
- FACTORED FORM:

3. $f(x) = -2x^2 + 8x - 6$

- VERTEX:
- VERTEX FORM:
- ZEROS:
- FACTORED FORM:

4. $f(x) = 2x^2 + 12x + 16$

- VERTEX:
- VERTEX FORM:
- ZEROS:
- FACTORED FORM:

Identify the vertex of each quadratic function. Then write the number of units that each function is translated from $y = x^2$. If the function is not translated in the given direction, leave the answer blank. Refer to the 11.7 example “Translating Quadratic Functions” in the Chapter 11 Summary.

FUNCTION	VERTEX	UNITS LEFT	UNITS RIGHT	UNITS UP	UNITS DOWN
6. $y = (x - 2)^2$					
7. $y = (x + 4)^2 + 3$					
8. $y = (x - 1)^2 - 4$					
9. $y = (x - 1)^2 - 5$					

10. Which statements are true about the function $f(x) = x^2 - 5x - 14$? Select ALL that apply.

- a. The y -intercept is $(0, -14)$.
- b. The zeros are $(-7, 0)$ & $(2, 0)$.
- c. The graph is a parabola that opens upward.
- d. The vertex is $(-5, -9)$.
- e. The domain is $(-\infty, \infty)$, aka all real numbers.
- f. The function is increasing on its entire domain.

Use the distributive property to write each quadratic function in standard form. Refer to the 11.1 example “Writing Quadratic Functions in Standard Form” in the Chapter 11 Summary.

11. $f(x) = 3x(x + 5)$

12. $g(n) = 3n(n - 1) - 3n + 7$

13. $h(t) = 7(t - 2) + 5t(3t)$

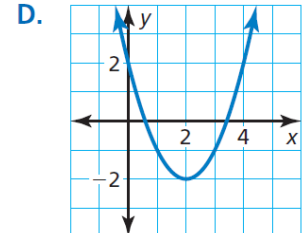
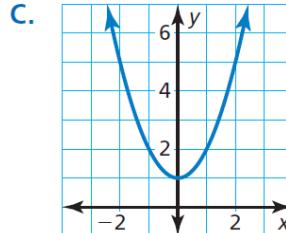
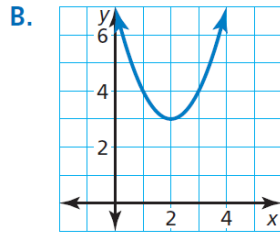
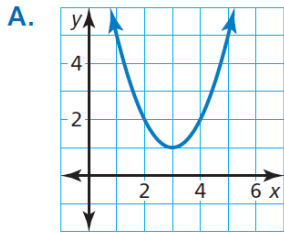
Consider the quadratic function given by $f(x) = (x - 2)^2 + 1$. Describe the transformation made to $f(x)$ to create the new function. Then match the function with its graph.

14. $g(x) = f(x - 1)$

15. $r(x) = f(x + 2)$

16. $h(x) = f(x) + 2$

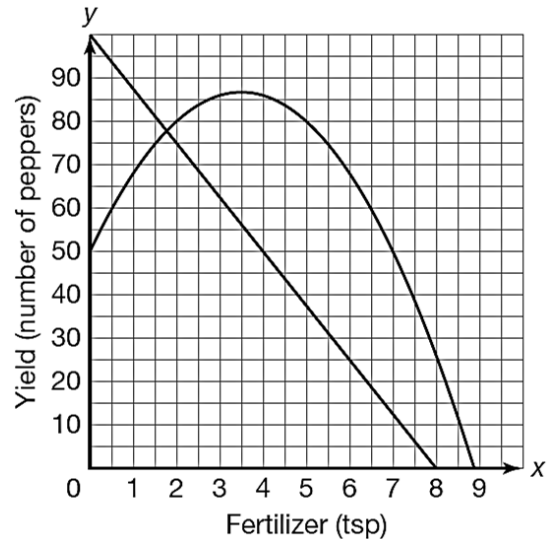
17. $p(x) = f(x) - 3$



18. The Quickgrow Fertilizer Company has run into problems with experimenting with a type of fertilizer that is supposed to increase yield of pepper plants. The yield for plant C can be represented by the function $C(x) = -12.5x + 100$. The yield for plant D can be represented by the function $D(x) = -3x^2 + 21x + 50$. The graphs of the yields for both plants are shown.

Use the graph and a graphing calculator, if necessary, to determine the following characteristics.

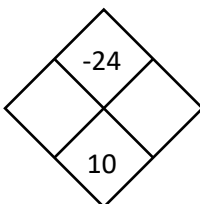
- Determine the y -intercept of $C(x)$ and describe its meaning in terms of the problem situation.
- Determine the y -intercept of $D(x)$ and describe its meaning in terms of the problem situation.
- Determine the x -intercept of $C(x)$ and describe its meaning in terms of the problem situation.



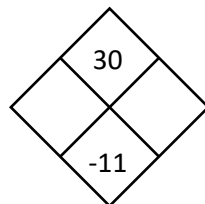
- Determine the x -intercept of $D(x)$ and describe its meaning in terms of the problem situation.
- Determine the absolute maximum of $D(x)$ and describe its meaning in terms of the problem situation.

An X-box is a pattern for which the product of two numbers is placed on top, while the sum of the same two numbers is placed on the bottom. This pattern is demonstrated in the X-box below. Copy and complete each X-box pattern below.

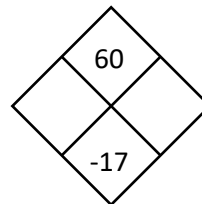
19.



20.



21.



PRODUCT \Downarrow

