

Name \_\_\_\_\_

Date \_\_\_\_\_ Pd. \_\_\_\_\_

**Notes: Dilations and the Vertex Form of a Quadratic Function**

Predict the properties of the graphs of  $y = x^2$  and  $y = 2x^2$ . Graph to check the predictions.

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Generalize the effect of the value of  $a$  on the graph and the pattern of change for  $y = ax^2$ .

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Discuss how the parameters in the vertex form of a quadratic function,  $f(x) = a(x - h)^2 + k$ , are related to the properties of the function:

- o The vertex will be at the point \_\_\_\_\_.
- o The axis of symmetry will be \_\_\_\_\_.
- o If  $a > 0$ , the parabola will open upwards, the vertex will be its \_\_\_\_\_ point, the y-value of the vertex will be its \_\_\_\_\_ value.
- o If  $a < 0$ , the parabola will open downwards, the vertex will be its \_\_\_\_\_ point, the y-value of the vertex will be its \_\_\_\_\_ value.
- o For  $a = 1$ , the parabola will have the same \_\_\_\_\_ as the parent function,  $y = x^2$ .
- o For  $0 < |a| < 1$ , the graph will appear \_\_\_\_\_ than the parent function graph.
- o For  $|a| > 1$ , the graph will appear \_\_\_\_\_ than the parent function graph.

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Date \_\_\_\_\_ Pd. \_\_\_\_\_

**Exit Card: Dilations and the Vertex Form of a Quadratic Function**Which of the following is the vertex of the graph of  $f(x) = 3(x - 5)^2 + 7$ ?F.  $(-5, -7)$ G.  $(-5, 7)$ H.  $(5, -7)$ J.  $(5, 7)$ 

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Date \_\_\_\_\_ Pd. \_\_\_\_\_

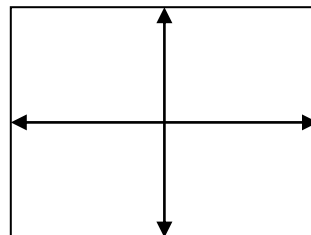
**Exit Card: Dilations and the Vertex Form of a Quadratic Function**Which of the following is the vertex of the graph of  $f(x) = 3(x - 5)^2 + 7$ ?F.  $(-5, -7)$ G.  $(-5, 7)$ H.  $(5, -7)$ J.  $(5, 7)$

Name \_\_\_\_\_

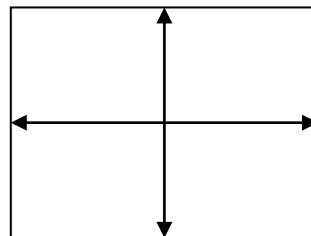
Date \_\_\_\_\_ Pd. \_\_\_\_\_

**Homework: Page 532 (1 – 12)**

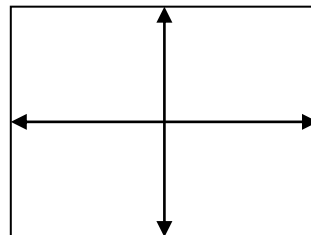
1. Graph  $y = -x^2$ ,  $y = -3x^2$ , and  $y = -6x^2$  on the same screen of your graphing calculator. Compare and contrast the graphs.



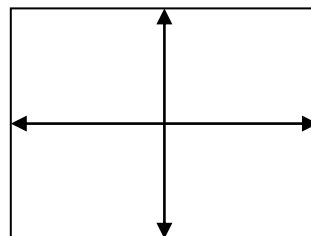
2. Graph  $y = -x^2$ ,  $y = -0.6x^2$ , and  $y = -0.4x^2$  on the same screen of your graphing calculator. Compare and contrast the graphs.



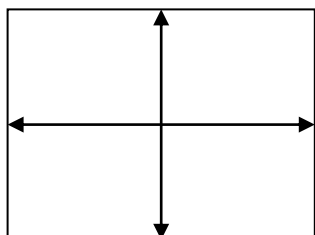
3. Graph  $y = -x^2$ ,  $y = -(x+5)^2$ , and  $y = -(x-4)^2$  on the same screen of your graphing calculator. Compare and contrast the graphs.



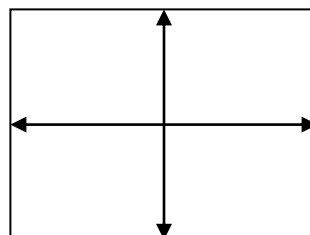
4. Graph  $y = -x^2$ ,  $y = -x^2 + 7$ , and  $y = -x^2 - 5$  on the same screen of your graphing calculator. Compare and contrast the graphs.



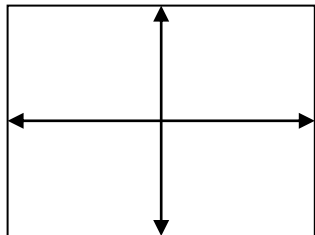
5. Predict the appearance of the graph  $y = -0.1x^2$ , then draw the graph.



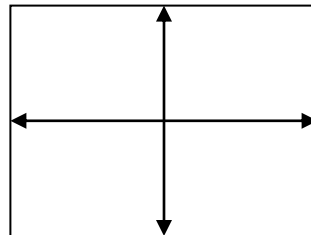
6. Predict the appearance of the graph  $y = (x+1)^2$ , then draw the graph.



7. Predict the appearance of the graph  $y = 4x^2$ , then draw the graph.



8. Predict the appearance of the graph  $y = x^2 - 6$ , then draw the graph.



9. Describe how the change from  $y = x^2$  to  $y = ax^2$  affects the graph. Be sure to consider all values of  $a$ .

10. Describe how the change from  $y = x^2$  to  $y = (x + h)^2$  affects the graph. Be sure to consider all values of  $h$ .

11. Describe how the change from  $y = x^2$  to  $y = x^2 + k$  affects the graph. Be sure to consider all values of  $k$ .

12. Describe how the change from  $y = x^2$  to  $y = (x + h)^2 + k$  affects the graph. Be sure to consider all values of  $h$  and  $k$ .