

Lesson 4.4 • Translations and the Quadratic Family

Name _____ Period _____ Date _____

1. Describe the translations of the graph of $y = x^2$ needed to produce the graph of each equation.
 - a. $y = x^2 - 6$
 - b. $y = (x + 5)^2$
 - c. $y = x^2 + 2.5$
 - d. $y = (x - 10)^2$
 - e. $y = (x - 3)^2 - 9$
 - f. $y = (x + 7.5)^2 + 2.5$
2. Find the vertex of each parabola.
 - a. $y = x^2$
 - b. $y = x^2 + 3$
 - c. $y = x^2 - 4$
 - d. $y = (x - 2)^2$
 - e. $y = (x + 3)^2$
 - f. $y = (x + 1)^2 + 5$
 - g. $y = (x - 4)^2 - 10$
 - h. $y = 4 + (x - 7)^2$
 - i. $y = -8 + (x + 5)^2$
3. Each parabola described is the graph of $y = x^2$. Write an equation for each parabola and sketch its graph.
 - a. The parabola is translated left 3 units.
 - b. The parabola is translated up 1 unit.
 - c. The parabola is translated right 5 units.
 - d. The parabola is translated down 4 units.
 - e. The parabola is translated left 4 units and up 2 units.
 - f. The parabola is translated right 2 units and down 3 units.
4. Describe what happens to the graph of $y = x^2$ in the following situations.
 - a. y is replaced with $(y + 1)$.
 - b. x is replaced with $(x - 5)$.
 - c. x is replaced with $(x + 3)$.
 - d. y is replaced with $(y - 6)$.
5. Solve.
 - a. $x^2 = 49$
 - b. $x^2 + 6 = 31$
 - c. $x^2 - 12 = 52$
 - d. $(x + 4)^2 = 81$
 - e. $(x - 3)^2 = 100$
 - f. $(x + 7)^2 = 144$
 - g. $x^2 = 17$
 - h. $x^2 - 11 = 19$
 - i. $(x + 2)^2 = 13$
 - j. $(x + 4)^2 - 5 = 31$
 - k. $14 + (x + 12)^2 = 35$
 - l. $-20 + (x - 5)^2 = 3$