NAME _____ DATE _____

Practice 29

FOR USE WITH SECTION 5.4

Write each function in vertex form.

1. $y = x^2 - 10x + 19$ **2.** $y = x^2 + 8x - 2$ **3.** $y = -x^2 + 6x - 2$

4. $y = 3x^2 + 12x - 9$ **5.** $y = -2x^2 - 6x - 4$ **6.** $y = 3x^2 + 3x$

7. $y = 4x^2 - 10x + 8$ **8.** $y = 5x^2 + 30x + 15$ **9.** $y = \frac{1}{4}x^2 - \frac{1}{2}x + 1$

State whether each function has a *maximum* or *minimum* value. Then find that value.

10. $y = x^2 - 2x + 3$ **11.** $y = 5x^2 + 30x + 4$ **12.** $y = -3x^2 + 18x - 2$

13. $y = 2x^2 + 28x - 5$ **14.** $y = -\frac{1}{2}x^2 + 9x - 2$ **15.** $y = -4x^2 - 6x + 2$

16. In a springboard dive, Ho Chan's center of gravity starts at a point 7 ft above the water, and she takes off with an upward velocity of 16 ft/s.

a. Write an equation to model the height of Ho Chan's center of gravity above the water at time t (in seconds) after she takes off.

b. How long after her take off does her center of gravity reach its maximum height?

c. What maximum height does her center of gravity reach?

17. Playing miniature golf, Marta hit the ball with an initial vertical velocity of 12 ft/s upward from the bottom of an incline. If the ball were placed at any point on the incline, it would roll down, losing $8t^2$ ft of height in t seconds.

a. Write an equation to model the height of Marta's golf ball above the bottom of the incline after t seconds.

b. What maximum height does Marta's ball reach?

18. Open-Ended Problem Describe a situation in which an object is thrown or propelled upward and then undergoes free fall. Estimate the object's initial upward velocity, and then calculate the maximum height it reaches.