Algebra 1
Unit 3 Test Review

Name:_____

Factor each of the following expressions:

1) $64n^2 - 169$

2) $169n^2 - 4$

3) $b^2 - 18b + 81$

4) $4x^2 + 12x + 9$

5) $b^2 + 3b - 70$

6) $x^2 - 12x + 27$

7) $3k^2 - 12k + 12$

8) $2b^2 - b - 15$

Solve each of the following equations:

9) $x^2 - 12x = -36$

10) $p^2 + 16 = 10p$

11) $7n^2 + 8 = 505$

12) $5n^2 - 4 = -75$

13) $x^2 + 16x + 51 = -9$

14) $n^2 - 2n - 33 = -10$

15) $4x^2 - 4x = -11$

16) $4a^2 - 100 = 0$

Convert the following equations to Vertex Form:

17) $y = x^2 - 8x + 15$

18) $y = -2x^2 + 16x - 36$

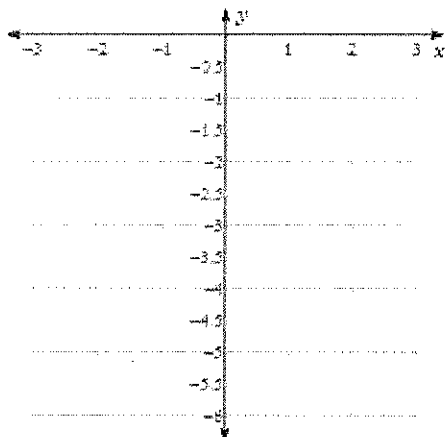Convert the following equations to Standard Form:
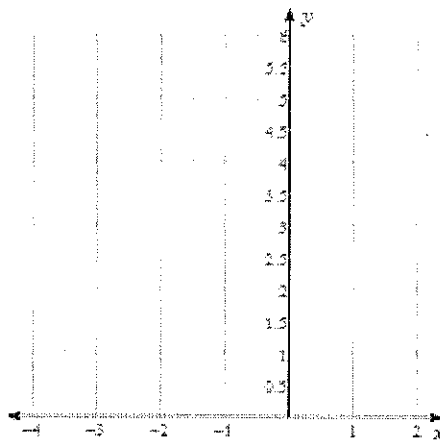
19) $y = (x+2)^2 + 4$

20) $y = 2(x+1)^2 + 4$

21) Write the quadratic equation of parabola with the following information:
Vertex (1,3) passing through (4,8)
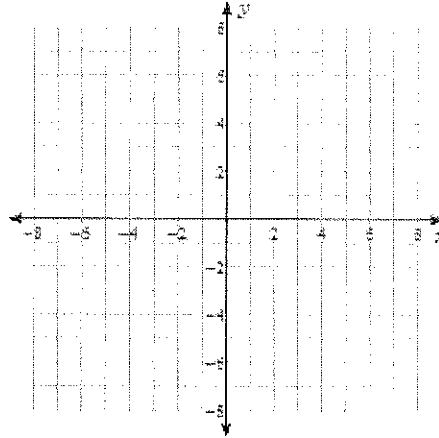
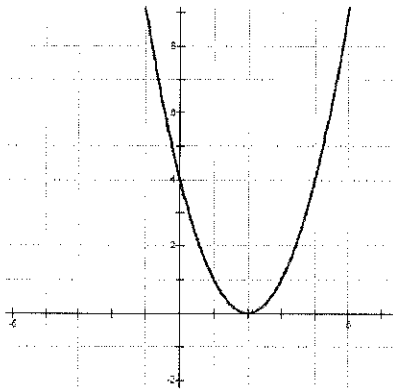## Sketch the graph of each function.

22) $y = -x^2 + 2x - 2$

23) $y = (x+1)^2 + 1$

24) $f(x) = (x + 4)(x + 2)$

25) Identify the listed characteristics of the following graph:

D:_____   R:_____

Interval of Increase: _____

Interval of Decrease: _____

Vertex: _____ Axis of Symmetry: _____

Max or Min? _____ at _____

End Behavior: As x → - ∞, y → _____   As x → ∞, y → _____

x-intercept: _____   y-intercept: _____

26) Identify the transformations for the following quadratic functions in the chart.

Equation	Horizontal Shift	Vertical Shift	Reflection
$f(x) = (x - 6)^2 + 2$			
$f(x) = -2(x + 1)^2 + 2$			
$f(x) = 4x^2 + 10$			
$f(x) = -\frac{1}{2}(x + 3)^2 - 4$			
$f(x) = -\frac{2}{5}(x - 5)^2 + 1$			

27) The length of a rectangular plot is 12 yards more than its width. If the area of the land is 448 square yards, find the dimensions of the plot.

28) Jordan is hitting baseballs. He tosses the ball 5 ft high in front of him and then hits the ball. The ball leaves the bat with an initial velocity of 50 ft/sec. (hint: use $h(t) = -.16t^2 + vot + ho$)
Equation:
a. How high is the ball 3 seconds after it has been hit?
b. How long does an outfielder have to react until the ball hits the ground?
c. What is the maximum height of the baseball?
d. During what interval is the ball above 26 feet high?

29) On Tuesday, May 10, 2005, 17 year-old Adi Alifuddin Hussin won the boys' shot-putt gold medal for the fourth consecutive year. His winning throw was 16.43 meters. A shot-putter throws a ball at an inclination of 45° to the horizontal. This can be modeled by $h = -0.01x^2 + 1.06x + 0.02$ where h is the approximate height of a ball thrown by a shot-putter as it travels a distance of x meters horizontally.
What would be the height of the ball if it travels 80 meters?

30) At a baseball game, workers toss T-shirts to spectators in the stands out of a slingshot. The height of a Tshirt is modeled by the function $h(t) = -5t^2 + 20t + 1$ where $h(t)$ is height in meters and t is the time in seconds after the toss.
a. What is the maximum height of the T-shirt if it is not caught?
b. How much time does it take the T-shirt to reach that maximum height?