Chapter 2A Practice Test

1. A graph has a vertex at (2, -9) and goes through the point (5,27). Find the equation of the graph in vertex form and standard form.

$27 = a(5-2)^2 - 9$

$36 = 9a$

$4 = a$

$\boxed{y = 4(x-2)^2 - 9}$

$y = 4(x^2 - 4x + 4) - 9$

$y = 4x^2 - 16x + 16 - 9$

$\boxed{y = 4x^2 - 16x + 7}$

2. The x-intercepts of a graph are $\left(-\frac{5}{2}, 0\right)$ and $(6,0)$. The graph goes through $(9,-23)$. Solve for the equation of the parabola in factored form.

$y = a(2x+5)(x-6)$

$-23 = a(2 \cdot 9 + 5)(9-6)$

$-23 = a(23)(3) \rightarrow a = -1/3$

$\boxed{y = -1/3(2x+5)(x-6)}$

3. The x-intercepts of a graph are $(-7,0)$ and $(-10,0)$. The graph goes through $(12,836)$. Solve for the equation of the parabola in factored form and standard form.

$836 = a(12+7)(12+10)$

$836 = 418a$

$2 = a$

$\boxed{y = 2(x+7)(x+10)}$

$y = 2(x^2 + 17x + 70)$

$\boxed{y = 2x^2 + 34x + 140}$

Factor the following completely.

4. $6x^2 - 24$

$6(x^2 - 4)$

$6(x-2)(x+2)$

5. $x^2 - 23x + 132$

$(x-11)(x-12)$

6. $3x^2 - 12x - 135$

$3(x^2 - 4x - 45)$

$3(x-9)(x+5)$

7. $10x^2 - 29x - 21$ $a \cdot c = -210$ $b = -29$ -35 6

$10x^2 - 35x + 6x - 21$

$5(2x-7) + 3(2x-7)$

$(5x+3)(2x-7)$

8. $4x^2 - 64$

$4(x^2 - 16)$

$4(x-4)(x+4)$

9. $4x^2 - 14x - 8$

$2(2x^2 - 7x - 4)$

$2(2x+1)(x-4)$

10. Now solve for the x-intercepts for #4 & #5

(4) $x = 2, x = -2$

(5) $x = 11, x = 12$

11. Solve by factoring: $21x + 108 = -x^2$

$x^2 + 21x + 108 = 0$

$(x+12)(x+9) = 0$

$\boxed{x = -12, -9}$

12. The following equation $f(x) = -6x^2 + 12x + 378$ represents the time it takes for a soccer ball to get kicked into the air and come back down. Height is measured in yards.

a. What is the maximum height of the ball?

$h = -12/2(-6) = 1$ $\quad y = -6 + 12 + 378 = 384$

384ft

b. When does the ball hit the ground?

$0 = -6(x^2 - 2x - 63)$

$0 = -6(x-9)(x+7)$

$x = 9$

13. State the key features of $y = 12(x+8)^2 - 5$

Vertex: $(-8, -5)$ Max or Min

Axis of Symmetry: $x = -8$

Domain: $(-\infty, \infty)$ Range: $[-5, \infty)$

14. Your class is doing a project when you get to launch homemade rockets into the air. Your team's rocket reached its maximum height of 60ft after 7 seconds. After 11 seconds, the rocket is still 52 ft in the air. Find the equation that represents this rocket in vertex and standard form.

V: (7, 60)

pt: (11, 52)

$y = a(x-7)^2 + 60$

$52 = a(11-7)^2 + 60$

$-8 = 16a$

$-1/2 = a$

$y = -1/2(x-7)^2 + 60$

$y = -1/2(x^2 - 14x + 49) + 60$

$y = -1/2x^2 + 7x - 49/2 + 60^{120/2}$

$y = -1/2x^2 + 7x + 71/2$

15. Sketch a complete graph of $y = -\frac{1}{2}x^2 - x + 4$. Be sure to include the vertex, y-intercept and symmetrical point.

$h = \frac{-(-1)}{2(-1/2)} = \frac{1}{-1} = -1$

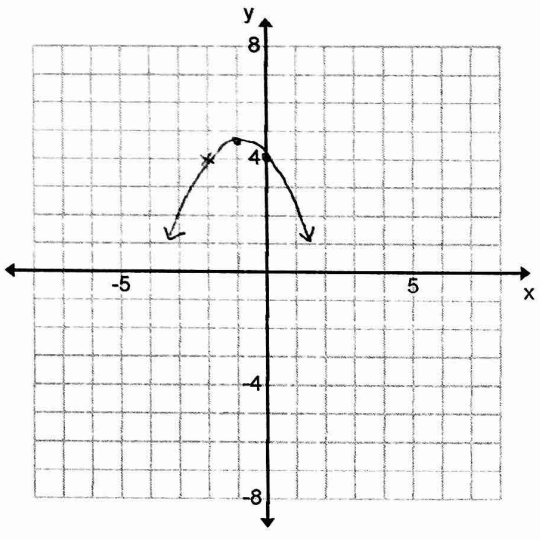
$y = -1/2(1) - (-1) + 4$

$y = -1/2 + 1 + 4$

$y = 4.5$

V: (-1, 4.5)

y-int: (0, 4)



16. Frank State College is trying to maximize it's profit in the cafeteria. They come up with a price equation for the pasta that is $f(x) = -4x^2 + 200x + 92$. How many pasta plates should they sell per night to maximize their profit?

$h = -200/2(-4) = 25$

25 plates

$y = -4(25)^2 + 200(25) + 92$

y = $2592