Math 2 Review- Quadratics

Name:_____

Simplify the following polynomials:

1. $(3x^3 + 2x - 4) - (2x^2 - 5x + 2)$

2. $(2y - 4)^2$

3. $(6x^2 + 4x - 2) - 2(5x + 1)$

4. $(3x^4 - 8y + 2) + (-x^4 + y^2 - 3)$

Factor the following polynomials completely:

5. $6x^2 - 7x + 2$

6. $x^4 + 2x^3 - x^2 - 2x$

7. $2x^6 - 2x^4 - 24x^2$

8. $16x^4 - 1$

9. $12x^2 - 5xy - 2y^2$

10. a) The area of a rectangle is equal to $2x^2 - x - 1$. What is the length and width of the rectangle?

b) Find the area if the length is increased by 6 and x=4.

Describe how the following functions were translated from the function $f(x) = x^2$

11. $f(x) = (x + 4)^2 - 4$

12. $y = 10 - 2(x - 2)^2$

Identify the axis of symmetry, vertex, and the domain and range of each function.

13. $f(x) = x^2 - 4$

14. $y = 2(x - 1)^2$

15. Write the equation in standard and vertex form of the parabola if the vertex is (-3,6) and it contains the point (1,-2).

Identify the vertex, axis of symmetry, min or max, and domain and range of the following functions. Then write each in vertex form.

16. $y = x^2 + 6x + 9$ 17. $y = -x^2 - 3x + 6$

18. $f(x) = 2x^2 - 4x + 6$ Find the vertex and y-intercept.

19. What is the x value of the vertex in the equation? $y = -5x^2 + \frac{4}{7}$

Solve the following quadratic equations by factoring.

20. $x^2 + 6x + 8 = 0$ 21. $2x^2 = 8x$ 22. $2x^2 + 6x = -4$

Solve each equation using the Quadratic Formula.

23. $2x^2 - 6x = 15$ 24. $2x^2 + 3 = 7x$

Evaluate the discriminant for each equation and determine the number and types of roots.

25. $5x + 1 = 3x^2$ 26. $4x^2 + 4x = -1$

Find the quadratic equation when given the following roots:

27. $-2, 3$ 28. $\frac{3}{5}, 6$

29. An object is launched straight up into the air at an initial velocity of 64 feet per second. It is launched from a height of 6 feet off the ground. Its height H, in feet, at t seconds is given by the equation H = $-16t^2 + 64t + 6$

a) Find all times t that the object is at a height of 54 feet off the ground.

b) Determine the time when the object hits the ground. (show algebraically)

30. A miniature rocket is fired from our soccer field and its path is modeled by the following formula where y is the height in meters and x is the time in seconds: $y = 40x - 4x^2$.

a) When is the rocket at a height of 64 meters?

b) How long is the rocket in the air?

31. A rectangle has a width that is 7 more than its length and an area of 30. Find the length and width of the rectangle.

32. The path of water from a sprinkler can be modeled by a quadratic function. The three functions below model paths for three different angles of the water.

Angle A: $y = -0.28(x - 3.09)^2 + 3.27$

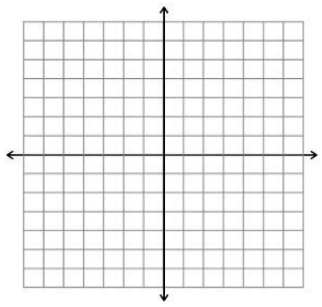
Angle B: $y = -0.14(x - 3.57)^2 + 2.39$

Angle C: $y = -0.19(x - 3.22)^2 + 1.53$

a.) Which sprinkler angle will send that water the highest. Explain your reasoning.

b.) Which sprinkler angle will send water the farthest? Explain your reasoning.

33. Graph $y = -x^2 + 2x + 5$ by showing a table of 5 values that includes the vertex in the middle.



34. The owner of a ranch wants to enclose a rectangular region with 100 feel of fencing. He wants to use one side of his bard as part of the enclosed region. What is the maximum area the rancher can enclose?

Solve by Square Root Method:

35. $2x^2 - 16 = 0$

36. $x^2 = 17$

37. $x^2 - 5 = 20$

Solve using any method:

38. $2x^2 + 3x = 6$

39. $5 = x^2 - 4x$

40. $8x^2 - 6x - 1 = 0$

41. $10x^2 = 8x$