Name: Key **Algebra II Quadratic Test Review**

Directions: Show all work on a separate sheet of paper.

Determine whether the function is linear or quadratic. Identify the quadratic, linear, and constant terms.

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

$-12x^2 - 23x - 10$

Quadratic

Q L C

2. $f(x) = (3x + 5)(6x - 3)$

$18x^2 + 21x - 15$

Quadratic

Q L C

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

$-29x - 5$

Linear

L C

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

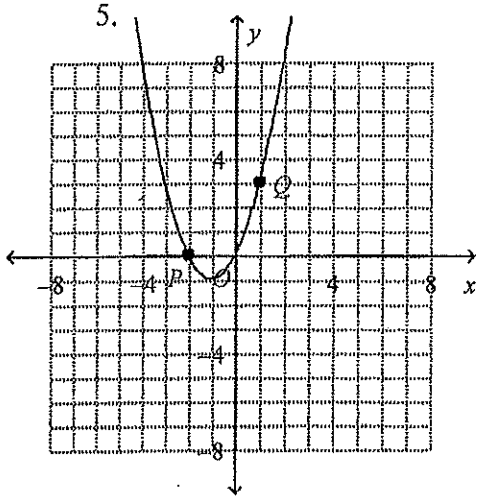
$-8x + 8$

Linear

L C

Identify the vertex and the axis of symmetry of the parabola. Identify points corresponding to *P* and *Q*. Answer the function questions to the side.

5.



Is it a function? Yes

Domain: $\mathbb{R}$ Range: $[-1, \infty)$

x-intercepts: 0 & 2 y-intercepts: 0

What is the max or min?

min @ -1

Where does the max or min occur?

min @ -1

Intervals of increasing/decreasing

$(-1, \infty)$ $(-\infty, -1)$

As $x \to \infty$, $y \to \infty$ As $x \to -\infty$, $y \to \infty$

Is the inverse a function?

No

Vertex: $(-1, -1)$ Axis of Symmetry: $x = -1$

P'= (0,0) Q'= (3,3)

6. A manufacturer determines that the number of drills it can sell is given by the formula. $D = -4p^2 + 176p - 325$, where p is the price of the drills in dollars, and D is the number of drills.

   a. At what price will the manufacturer sell the maximum number of drills?

   $\frac{-176}{-8} = \$22$ ↳ vertex

   b. What is the maximum number of drills that can be sold?

   $D(22) = 1,611$

7. The function $y = -16t^2 + 344$ models the height y in feet of a stone t seconds after it is dropped from the edge of a vertical cliff. How long will it take the stone to hit the ground?

   ↳ quad form or solve

   $t = 4.637$ seconds

   $t = \pm 4.637$

8. A skating rink manager finds that revenue R based on an hourly fee F for skating is represented by the function $R = -480F^2 + 3120F$. What hourly fee will produce maximum revenues?

   $\frac{-3120}{2(-480)} = \$3.25$

9. A diver is standing on a platform and jumps from the platform. The equation $h = -16t^2 + 24t + 8$, where h is his height above the water, t is the time. How long will it take for him to hit the water?

   ↳ quad form, factor, solve

   $h = -16t^2 + 24t + 8$

   $8(-2t^2 + 3t + 1)$

   $h = 8(\quad)(\quad)$

   ant factor

   $\frac{-24 \pm \sqrt{24^2 - 4(-16)(8)}}{-32}$

   $h = 1.78$

10. You and a friend are hiking in the mountains. You want to climb to a ledge that is 20ft above you. The height of the grappling hook you throw is given by the function $h = -16t^2 - 32t + 5$. What is the maximum height of the grappling hook?

    $\frac{32}{2(-16)} = -1 \quad h(-1) =$ **21 ft**

11. Simplify $\sqrt{-150}$ using the imaginary number i.

$5i\sqrt{6}$

12. Simplify $\sqrt{-45}$ using the imaginary number i.

$3i\sqrt{5}$

13. Simplify $\sqrt{-250}$ using the imaginary number i.

$5i\sqrt{10}$

Simplify the expression.

14. $(-1 + 3i) + (6 - 4i)$

$5 - 1i$

15. $(6 - 4i) - (-4 + 5i)$

$10 - 9i$

16. $(3i)(3i)$

$9i^2 \rightarrow -9$

17 $(4 - 2i)(-6 + 5i)$

$-14 + 32i$

18. $(-5 + 4i)(-3 - 2i)$

$23 - 2i$

Solve the equation using the quadratic formula.

19. $-3x^2 + 8x - 5 = 0$

$x = \frac{5}{3}$ & 1

20. $-5x^2 - 5x + 8 = 0$

$\frac{5 \pm \sqrt{185}}{-10}$ or $\frac{-1}{2} \pm \frac{\sqrt{185}}{-10}$

21. $-5x^2 - 3x - 7 = 0$

$\frac{3 \pm i\sqrt{131}}{-10}$

22. $4x^2 + 3x + 3 = 0$

$\frac{-3 \pm i\sqrt{39}}{8}$

23. Graph: $y = x^2 + 3x + 2$. Identify the vertex and the axis of symmetry.

$V = \frac{-b}{2a} \rightarrow \frac{-3}{2}$ $\quad V = \left(\frac{-3}{2}, -\frac{1}{4}\right)$

$\left(\frac{-3}{2}\right)^2 + 3\left(\frac{-3}{2}\right) + 2 \rightarrow -\frac{1}{4}$ $\quad AOS: x = -\frac{3}{2}$

24. Determine the type and number of solutions to the function: $5x^2 - 4x + 2 = 0$.

$\sqrt{16 - 4(5)(2)}$

$\sqrt{-24} \rightarrow$ 0 real solutions

Factor each expression:

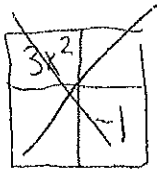
Check:

25. $8x + 20$

$4(2x + 5)$

26. $15x^3 + 25x^2 - 5x$

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



-3
5 1

27. $8y^2 + 6y$

$2y(4y + 3)$

28. $4x^2 - 1$

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

Check:

29. $9x^2 - 100$

$(3x + 10)(3x - 10)$

30. $18x^2 - 50$

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

31. $x^2 + 12x + 35$

$(x + 7)(x + 5)$

32. $x^2 + 13x + 40$

$(x + 8)(x + 5)$

Check:

33. $x^2 - 4x - 32$

$(x-8)(x+4)$

34. $2x^2 - 2x - 84$

$2(x-7)(x+6)$

35. $x^2 - 16x + 63$

$(x-9)(x-7)$

36. $2x^2 - 22x + 48$

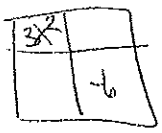
$2(x-8)(x-3)$

37. $2x^2 + 9x + 4$

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

Check:

38. $3x^2 + 4x - 6$



-18

$-^{+}_{-} = 4$

CANT

39. $4x^2 + 9x + 2$

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

40. $9x^2 + 10x + 1$

$(x+1)(9x+1)$

41. $5x^2 + 7x + 2$

$(x+1)(5x+2)$

42. $6x^2 + 55x + 9$

$(6x+1)(x+9)$