Name _____ Date _____ Pd _____

WCHS Review for Test 2-3 Quadratics Pre-AP Algebra 2

Remember: You will have a calculator for the test.

Solve for the roots by factoring.

1. $x^2 - 5x + 10 = 4$

$-4 \quad -4$

$x^2 - 5x + 6 = 0$

$(x-2)(x-3) = 0$

$\boxed{x = 2} \quad \boxed{x = 3}$

2. $s^2 - s - 3 = s$

$-s \quad -s$

$s^2 - 2s - 3 = 0$

$(s-3)(s+1) = 0$

$\boxed{s = 3} \quad \boxed{s = -1}$

3. $3x^2 + 7x - 24 = 13x$

$-13x \quad -13x$

$\frac{3x^2}{3} - \frac{6x}{3} - \frac{24}{3} = \frac{0}{3}$

$x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$\boxed{x = 4} \quad \boxed{x = -2}$

Solve for the roots using the quadratic formula leave in simplified radical form.

4. $y = x^2 - 2x + 25$

$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(25)}}{2(1)}$

$x = \frac{2 \pm \sqrt{4 - 100}}{2}$

$x = \frac{2 \pm \sqrt{-96}}{2} = \frac{2 \pm 4i\sqrt{6}}{2}$

96 = 2 · 48 = 4 · 8 = 3 · 2 · 2 · 4 = 2 · 2 · 2 · 2 · 3

$\boxed{x = 1 \pm 2i\sqrt{6}}$

5. $y = -4x^2 + 8x + 2$

$x = \frac{-8 \pm \sqrt{(8)^2 - 4(-4)(2)}}{2(-4)}$

$x = \frac{-8 \pm \sqrt{64 + 32}}{-8}$

$x = \frac{-8 \pm \sqrt{96}}{-8}$

$x = \frac{-8 \pm 4\sqrt{6}}{-8}$

$\boxed{x = \frac{-2 \pm \sqrt{6}}{-2}}$

6. $y = 2x^2 - 9x + 18$

$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(18)}}{2(2)}$

$x = \frac{9 \pm \sqrt{81 - 144}}{4}$

$x = \frac{9 \pm \sqrt{63}}{4} = \frac{9 \pm 3i\sqrt{7}}{4}$

$\boxed{x = \frac{9 \pm 3i\sqrt{7}}{4}}$

Find the discriminant. How many solutions are there? Are the solutions real or imaginary?

7. $y = 3x^2 - 6x + 4$

$(-6)^2 - 4(3)(4)$

$36 - 48 = \boxed{-12}$

$\boxed{2 \text{ complex/imaginary}}$

8. $y = -2x^2 - 6x + 3$

$(-6) - 4(-2)(3)$

$36 + 24 = \boxed{60}$

$\boxed{2, \text{real, irrational}}$

9. $y = -6x^2 - 4x - 5$

$(4)^2 - 4(-6)(-4)$

$16 - 120 = \boxed{-104}$

$\boxed{2 \text{ complex/imaginary}}$

Convert to vertex form by completing the square.

$-10/2 = (5)^2 = 25$

10.

$$y = -2x^2 + 20x - 45$$

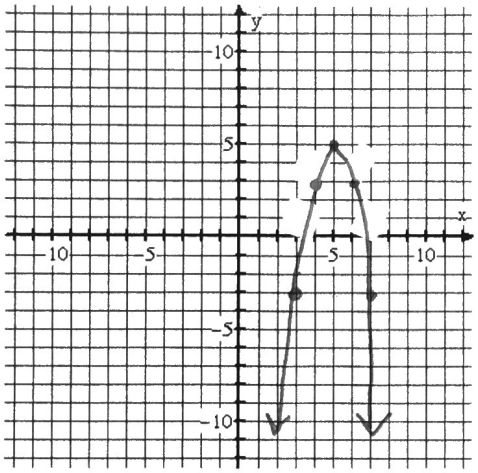
$y - 2(25) = -2(x^2 - 10x + 25) - 45$

$+50$

vertex:_____ y-intercept = ____

Vertex Form: $y = -2(x-5)^2 + 5$

11.



12.

$$y = (x+7)(x-6)$$

$y = x^2 + x - 42$

$(\frac{1}{2})^2 = \frac{1}{4}$

$y = (x^2 + x + \frac{1}{4}) - 42$

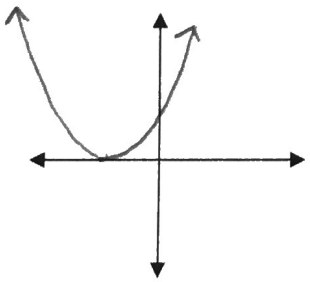
$+\frac{1}{4}$

$y + \frac{1}{4} = (x + \frac{1}{2})^2 - 42 - \frac{1}{4}$

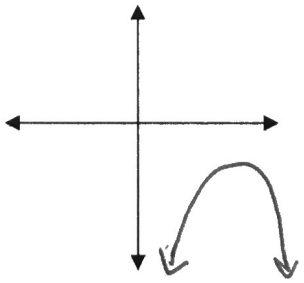
$-\frac{1}{4}$ $\quad -\frac{168}{4} - \frac{1}{4}$

$$y = (x + \frac{1}{2})^2 - \frac{169}{4}$$

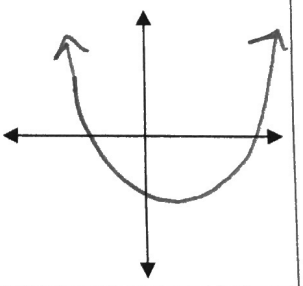
13. Sketch a graph of a quadratic function that has a discriminant of zero.



14. Sketch a graph of a quadratic functions that has a discriminant that is negative.

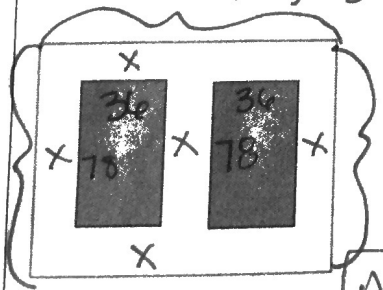


15. Sketch a graph of a quadratic function that has a discriminant that is positive.



16. The school wants to build 2 new tennis courts. (pictured below). If each court is 78ft by 36 ft with a consistent space between and around the court, write an equation for the total area. (Do not solve.)

$3x + 2(36) = 3x + 72$

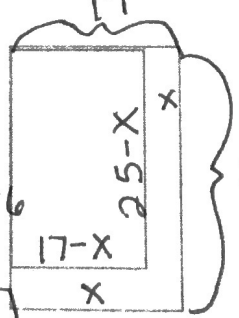


$(2x+78)(3x+72) = A$

$A = 6x^2 + 144x + 234x + 5616$

$A = 6x^2 + 378x + 5616$

17. The Jones currently have a garden but need to decrease the area. The current dimensions are 25m by 17 m. Write and equation to show how much they should decrease each side by if they want the new area to be 336 square meters. (Do not solve.)



$(17-x)(25-x) = 336$

$425 - 17x - 25x + x^2 = 336$

$-336 \quad -336$

$$x^2 - 42x + 89 = 0$$

Solve by completing the square.

18) $5x^2 + 144 = 0$

$-144 \quad -144$

$\frac{5x^2}{5} = \frac{-144}{5}$

$\sqrt{x^2} = \sqrt{\frac{144}{5}}$

$x = \frac{\pm 12i}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$x = \pm \frac{12i\sqrt{5}}{5}$

19) $36(x-4)^2 + 63 = 0$

$-63 \quad -63$

$\frac{36(x-4)^2}{36} = \frac{-63}{36}$

$(x-4)^2 = -\frac{63}{36}$

$\sqrt{(x-4)^2} = \sqrt{-\frac{7}{4}}$

$x - 4 = \pm \frac{i\sqrt{7}}{2}$

$+4 \quad +4$

$x = 4 \pm \frac{i\sqrt{7}}{2}$

20) $5(x-5)^2 - 99 = 0$

$+99 \quad +99$

$\frac{5(x-5)^2}{5} = \frac{99}{5}$

$\sqrt{(x-5)^2} = \sqrt{\frac{99}{5}}$

$x - 5 = \pm \frac{3\sqrt{11}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$x - 5 = \pm \frac{3\sqrt{55}}{5}$

$+5 \quad +5$

$x = 5 \pm \frac{3\sqrt{55}}{5}$

99
9 · 11
3 · 3

21) Simplify the following

a) $(8 - 6i)(-4 - 4i)$

$-32 - 32i + 24i + 24i^2$

$-32 - 8i + 24(-1)$

-24

$-56 - 8i$

b) $-3i \cdot 6i - 3(-7 + 6i)$

$-18i^2 + 21 - 18i$

$-18(-1) + 21 - 18i$

$18 + 21 - 18i$

$39 - 18i$

c. $(19 - 2i) - (-4 + 63i)$

$19 - 2i + 4 - 63i$

$23 - 65i$

Solve for the roots using any method.

21) $y = 3x^2 - 2x - 5$

$0 = 3x^2 - 2x - 5$ $\quad -15$

$3 \mid -5$

$0 = (x + \frac{3}{3})(x - \frac{5}{3})$

$0 = (x + 1)(3x - 5)$

$x + 1 = 0 \quad 3x - 5 = 0$

$x = -1 \quad 3x = 5$

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

22) $y = 2x^2 + 3x - 9$

$0 = 2x^2 + 3x - 9$ $\quad -18$

1	18
2	9
-3	6

$0 = (x - \frac{3}{2})(x + \frac{6}{2})$

$0 = (2x - 3)(x + 3)$

$2x - 3 = 0 \quad x + 3 = 0$

$2x = 3 \quad x = -3$

$x = \frac{3}{2}$

23) $5x^2 + 12 = -18$ ← Change Question

$-12 \quad -12$

$\frac{5x^2}{5} = \frac{-30}{5}$

$\sqrt{x^2} = \sqrt{-6}$

$x = \pm i\sqrt{6}$

24. Write the equation of a quadratic graph that is shifted 8 units left, 2 units down and is reflected over the x-axis.

$y = -(x+8)^2 - 2$

35. Write a detailed description of the transformation of the following graph from the parent function.

a. $y = -\frac{1}{2}(x-3)^2 + 3$

- Vertical shrink by a half
- reflected over x-axis
- Shifted 3 units right
- Shifted 3 units up

b. $y = \frac{5}{2}(x+9)^2 - 3$

- Stretch vertically by 2.5
- horizontal shift 9 units to the left.
- Vertical shift 3 units down

36. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function , $h(t) = -16t^2 + 16t + 480$ where t is the time in seconds and h is the height in feet.

a. How long did it take for Jason to reach his maximum height?

.5 seconds

b. What was the highest point that Jason reached?

484 feet high.

c. Jason hit the water after how many seconds?

6 seconds to hit the water

37. If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation $h(t) = -16t^2 + 128t$ (if air resistance is neglected).

a. How long will it take for the rocket to return to the ground?

8 seconds

b. How long will it take the rocket to hit its maximum height?

4 seconds

c. What is the maximum height?

256 feet