

Algebra 2 Trig Honors
Quadratics Semester Review

No Calculator unless it says okay☺

Name Key

1. Transform to vertex form: $y = -3x^2 + 18x - 5$

$$y = -3x^2 + 18x - 5$$
$$y = -3(x^2 - 6x + 9) - 5 + 27$$
$$y = -3(x-3)^2 + 22$$

2. Find the x-intercept(s) of: $y = x^2 - 2x + 4$

$$0 = x^2 - 2x + 4$$
$$\frac{2 \pm \sqrt{4 - 4(1)(4)}}{2} \rightarrow \frac{2 \pm \sqrt{-12}}{2}$$
$$\frac{2 \pm 2i\sqrt{3}}{2} = \boxed{1 \pm i\sqrt{3}}$$

3. Tell **how many solutions** and what **type of numbers** (if real, state whether rational or irrational) for: $-5x^2 - 3x + 1 = 0$

disc: $b^2 - 4ac$

$$9 - 4(-5)(1)$$
$$9 + 20$$
$$\boxed{29} \quad 2 \text{ real-irrational}$$

4. Write an equation of a quadratic function with x intercepts 3 and -2, a vertical stretch bafo of 2 and a vertex below the x axis.

$$y = 2(x-3)(x+2)$$
$$y = 2(x^2 - x - 6)$$
$$\boxed{y = 2x^2 - 2x - 12}$$

5. Find the vertex, the x- and y- intercept(s) and the point symmetrical to the y-intercept. Plot 5 points on the graph below.

$$y = -4x^2 + 12x - 9$$

$$\text{Vertex} = \frac{-b}{2a} = \frac{-12}{2(-4)} = \frac{12}{8} = \frac{3}{2}$$

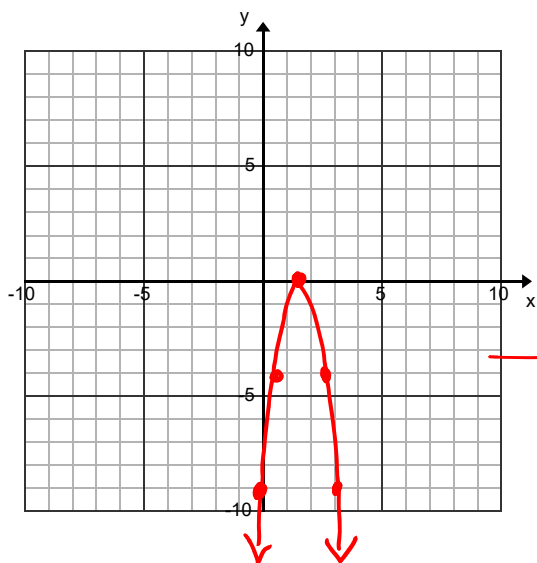
$$y_{\text{coord}} = -4\left(\frac{3}{2}\right)^2 + 12\left(\frac{3}{2}\right) - 9$$

$$= -4\left(\frac{9}{4}\right) + 18 - 9$$

$$= -9 + 18 - 9$$

$$y_{\text{coord}} = 0$$

$$\text{Vertex} \left(\frac{3}{2}, 0\right)$$



over 1 down 4
over 1 down 12

y int: -9

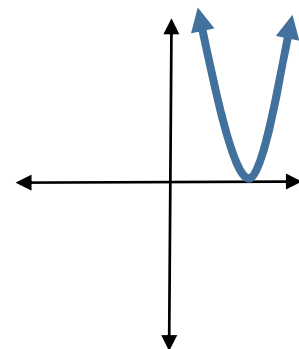
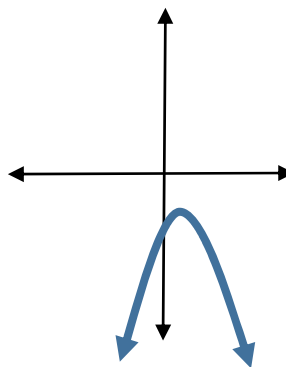
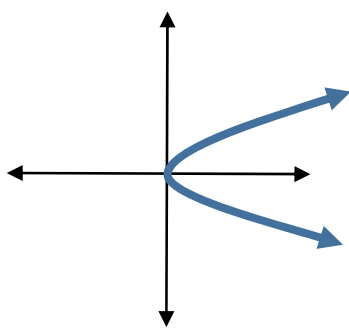
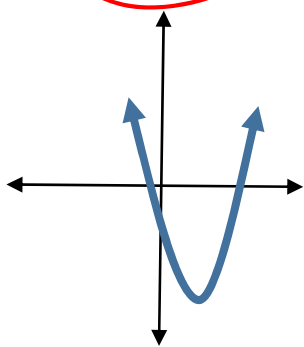
6. Given: $b^2 - 4ac > 0$, for $f(x) = ax^2 + bx + c$, which graph could possibly describe $f(x)$?

Graph A

Graph B

Graph C

Graph D



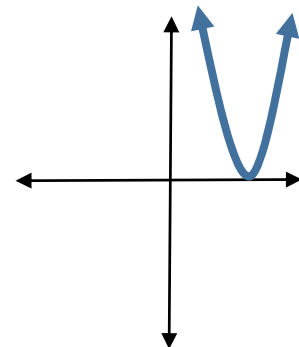
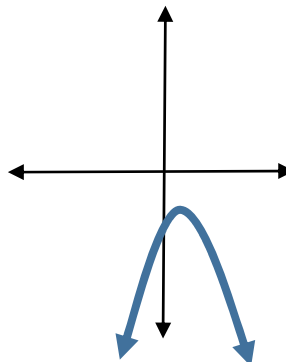
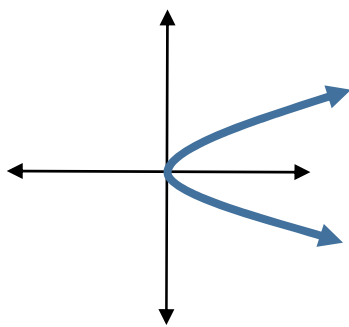
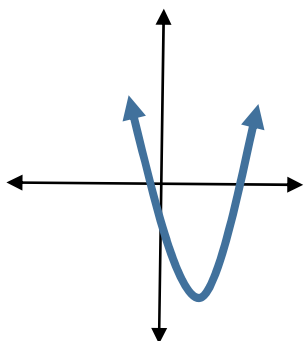
7. If the discriminant = 0, which graph could describe the graph of the quadratic function?

Graph A

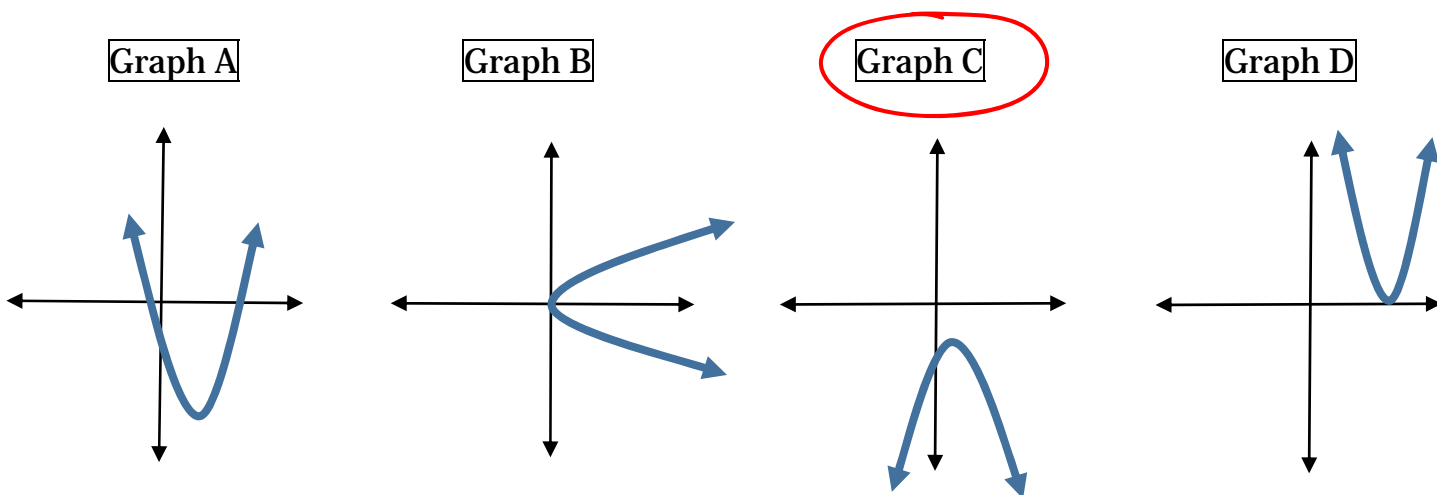
Graph B

Graph C

Graph D



8. If the zeros of a quadratic function were $-3 \pm i\sqrt{2}$, which graph could possibly describe $f(x)$?



9. Solve for x : $5x^2 - 25x = 0$

I. $x = 0$

II. $x = 5$

III. $x = -5$

a) II only

b) III only

c) II and III

d) I and II

$$5x^2 - 25x = 0$$

$$5x(x - 5) = 0$$

$$x = 0 \text{ or } 5$$

10. Which of the following represents a quadratic function that opens down and has no real roots?

a) $f(x) = 2x^2 + 4x + 7$

b) $f(x) = -2x^2 + 4x + 7$

c) $f(x) = -2x^2 - 4x + 7$

d) $f(x) = -2x^2 - 4x - 7$

$$b^2 - 4ac = - \neq$$

d) $16 - 4(-2)$

$$16 - 4(-2)(-7) = - \neq$$

$$16 - 56$$

11. What is the y -intercept of the parabola with vertex $(-3, -4)$ and through $(1, -36)$?

a) $(0, -76)$

b) $(0, -22)$

c) $(0, -28)$

d) $(0, -86)$

$$y = a(x-h)^2 + k$$

$$-36 = a(1+3)^2 - 4$$

$$-36 = 16a - 4$$

$$-32 = 16a$$

$h \quad k$

$x \quad y$

$$a = -2$$

$$y = -2(0+3)^2 - 4$$

$$y = -2(0+3)^2 - 4$$

$$y = -18 - 4$$

$$y = -22$$

12. The sum and product of roots, respectively of equation $4x^2 + 7x + 3 = 0$

$$(4x+3)(x+1)$$

$$\text{roots} = -3/4, -1$$

$$\text{sum} = -7/4 \quad \text{product} = 3/4$$

- A. $-7/4, -3/4$
- B. $-7/4, 3/4$
- C. $7/4, -3/4$
- D. $7/4, 3/4$

13. You kick a hacky-sack directly upward with an initial vertical velocity of 17 ft/sec . Your foot makes contact with the hacky-sack 1.2 feet above the ground. If the hacky sack misses your foot on the way down, how long does it take to hit the ground? $h = -16t^2 + v_0 t + h_0$

Calc ☺

- a. .07 seconds
- b. .53 seconds
- c. 1.13 seconds
- d. 5.7 seconds

$$y_2 = h_0 \quad y_1$$
$$0 = -16t^2 + 17t + 1.2$$

Use Calc - intersection

$$t = 1.13 \text{ seconds}$$

14. (Consider the same scenario above). At what time(s) is the hacky sack at 3ft? Calc ☺

- a. .94 seconds
- b. .12 seconds
- c. 1.13 seconds
- d. .12 seconds & .94 seconds

$$y_2 = 3 \quad y_1$$
$$3 = -16t^2 + 17t + 1.2$$

$$t = .12 \text{ and } .94 \text{ seconds}$$

15. Which of the following functions are equivalent?

I. $f(x) = 3(x-6)(x+4)$ $3x^2 - 6x - 72$

II. $f(x) = 3(x-1)^2 - 75$ $3x^2 - 6x - 72$

III. $f(x) = 3(x-1)^2 - 69$ $3x^2 - 6x - 66$

IV. $f(x) = 3x^2 - 6x - 72$

- A. I and III
- B. I and IV
- C. I, II, and IV
- D. I, III, and IV