

## Quadratics Test Math II

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1. Convert from standard form to vertex form:  $f(x) = 6x^2 + 12x - 5$

2. Factor this quadratic:  $3x^2 - 5x - 12$

3. Solve by factoring:  $x^2 = -9x + 36$

4. An object is launched at 19.6 meters per second (m/s) from a 58.8 meter tall platform. The equation for the object's height,  $s$ , at time  $t$  seconds after launch is:

$s(t) = -4.9t^2 + 19.6t + 58.8$ , where  $s$  is in meters. When does the object strike the ground?

5. Identify the ordered pair that represents the vertex:  $f(x) = -5x^2 + 20x - 17$

6. Solve the linear-quadratic system of equations:

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

7. Identify the VALUE of the discriminant and tell the number and type of roots of the quadratic:  $f(x) = 7x^2 - 2x + 3$

8. Two part question. Circle correct response inside of the parentheses.

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A quadratic equation with a negative discriminant will (always,sometimes,never) cross the x-axis.

When a quadratic equation is opening (upward,downward), the leading coefficient in standard form will be negative, and the y-value of the vertex is considered a (minimum,maximum).

9. Identify the vertex, axis of symmetry, and direction of opening:  $f(x) = -\frac{3}{2}(x - 5)^2 - 6$

10. A model rocket is projected directly upward from the ground. After  $t$  seconds its distance in feet above the ground is modeled by the equation:  $s = 144t - 16t^2$

- How long does it take for the object to reach its maximum height?
  
- What is the maximum height?

**TEN point BONUS:** A company is designing a steel box with an open top. The machine that bends the steel works best with rectangular sheets of steel whose length is 20 inches and width is 15 inches. A square will be punched out of each corner before the steel is bent up to form the box. If the area of the base of the tray needs to be 204 square inches, what size of corners should the company program the machine to punch out?

Quadratics Test Math II

KEY ANSWERS

1. Convert from standard form to vertex form:  $f(x) = 6x^2 + 12x - 5$

$$y = 6(x+1)^2 - 11$$

2. Factor this quadratic:  $3x^2 - 5x - 12$

$$(x-3)(3x+4)$$

3. Solve by factoring:  $x^2 = -9x + 36$

$$x^2 + 9x - 36 = 0$$

$$(x+12)(x-3) = 0$$

$$x = -12 \quad x = 3$$

4. An object is launched at 19.6 meters per second (m/s) from a 58.8 meter tall platform. The equation for the object's height,  $s$ , at time  $t$  seconds after launch is:

$s(t) = -4.9t^2 + 19.6t + 58.8$ , where  $s$  is in meters. When does the object strike the ground?

6 seconds

5. Identify the ordered pair that represents the vertex:  $f(x) = -5x^2 + 20x - 17$

$$y = -5x^2 + 20x - 17$$

$$x = 2, y = 3$$

6. Solve the linear-quadratic system of equations:  $y = x^2 - 6x + 5$

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

$$0 = x^2 - 4x$$

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

$$x = 0 \quad x = 4$$

$$2x + y = 5$$

$$(0, 5)$$

$$(4, -3)$$

7. Identify the VALUE of the discriminant and tell the number and type of roots of the quadratic:  $f(x) = 7x^2 - 2x + 3$

$$b^2 - 4ac = (-2)^2 - 4(7)(3)$$

$$4 - 84 = -80$$

2 imaginary roots

8. Two part question. Circle correct response inside of the parentheses.

A quadratic equation with a negative discriminant will (always, sometimes, never) cross the x-axis.

When a quadratic equation is opening (upward/downward), the leading coefficient in standard form will be negative, and the y-value of the vertex is considered a (minimum/maximum).

9. Identify the vertex, axis of symmetry, and direction of opening:  $f(x) = -\frac{3}{2}(x - 5)^2 - 6$

Vertex:  $(5, -6)$   
• Axis of symmetry:  $x = 5$   
• Opens down

10. A model rocket is projected directly upward from the ground. After  $t$  seconds its distance in feet above the ground is modeled by the equation:  $s = 144t - 16t^2$

- How long does it take for the object to reach its maximum height?

4.5 seconds

- What is the maximum height?

324 ft.

**TEN point BONUS:** A company is designing a steel box with an open top. The machine that bends the steel works best with rectangular sheets of steel whose length is 20 inches and width is 15 inches. A square will be punched out of each corner before the steel is bent up to form the box. If the area of the base of the tray needs to be 204 square inches, what size of corners should the company program the machine to punch out?

1.5 in.