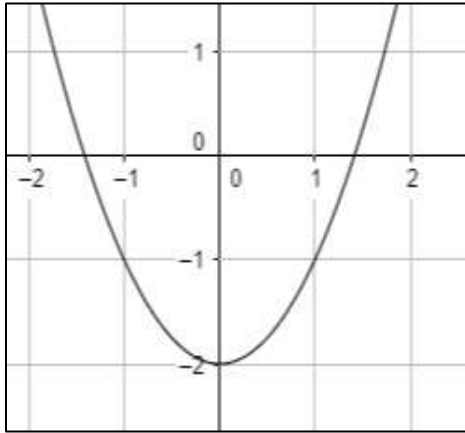
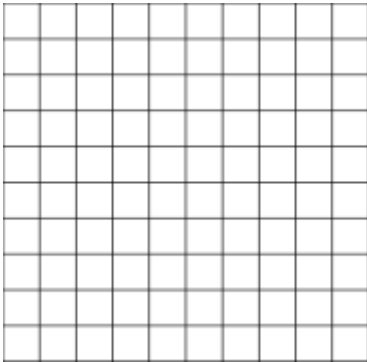


## Unit 9 – Quadratic Functions & Their Properties Test

1. Identify the vertex of the graph. Also, tell whether the vertex is a minimum or a maximum.



2. Graph the quadratic function  $y = x^2 - 1$ .



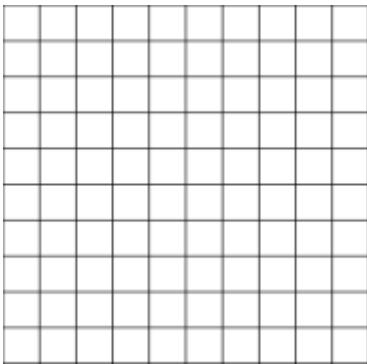
3. Identify the domain and range of the function  $y = 10x^2 + 0.5$ .

## Unit 9 – Quadratic Functions & Their Properties Test

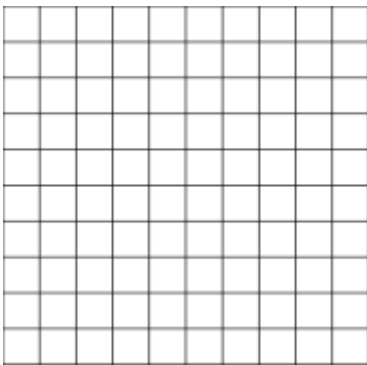
4. Identify the axis of symmetry and vertex of the graph of the quadratic function  $f(x) = x^2 - 8$ .

5. Graph the function using the vertex and axis of symmetry.

$$f(x) = -\frac{1}{2}x^2 + 8x - 2$$



6. Find the solution of the equation  $x^2 - 15 = -15$  by graphing the related function or mention if the equation has no solution.



## Unit 9 – Quadratic Functions & Their Properties Test

7. Find the solution of the equation  $2g^2 - 16 = -16$  by finding the square roots or mention if the equation has no solution.

8. Solve the equation  $(8t + 4)(3t + 6) = 0$

9. Solve the equation  $s^2 + 9s = -20$  by factoring.

## Unit 9 – Quadratic Functions & Their Properties Test

10. Find the value of  $c$  which will make the expression a perfect-square trinomial.

$$p^2 - 10p + c$$

11. Solve the equation by completing the square.

$$x^2 + 8x - 9 = 0$$

12. Evaluate the discriminant of the equation and tell how many solutions the equation has and are the solutions real or imaginary.

$$y = -5x^2 + 6x - 4$$

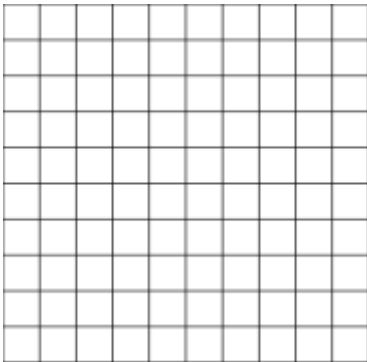
## Unit 9 – Quadratic Functions & Their Properties Test

13. Solve the quadratic equation using the quadratic formula.

$$x^2 = 3x + 2$$

14. Graph the set of points and determine which model best represents the data set.

(0,3), (1,1), (2,0), (3,1)



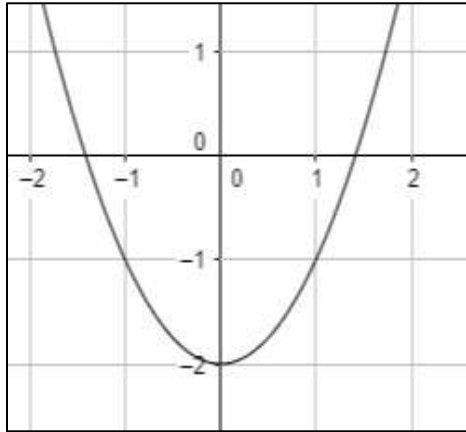
15. The graph of the equation  $y = e^x$  is a/an:

- a. Straight line
- b. U-shaped curve
- c. Increasing curve
- d. None of these

## Unit 9 – Quadratic Functions & Their Properties Test

### ANSWERS:

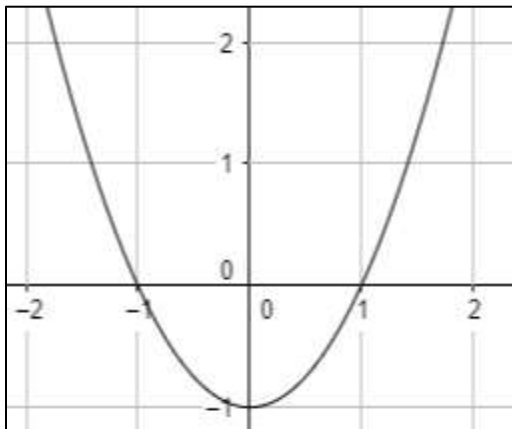
1. Identify the vertex of the graph. Also, tell whether the vertex is a minimum or a maximum.



**Vertex = (0,-2)**

**Parabola opens up, vertex is a minimum.**

2. Graph the quadratic function  $y = x^2 - 1$ .



3. Identify the domain and range of the function  $y = 10x^2 + 0.5$ .

**Domain: set of all real numbers**

**Range:  $y \geq 0.5$**

**Unit 9 – Quadratic Functions & Their Properties** Test

4. Identify the axis of symmetry and vertex of the graph of the quadratic function  $f(x) = x^2 - 8$ .

**Axis of symmetry:**

$$x = -\frac{b}{2a} \rightarrow -\frac{0}{2(1)} = 0$$

**Vertex:**

$$f(0) = 0^2 - 8 = -8 = (0, -8)$$

5. Graph the function using the vertex and axis of symmetry.

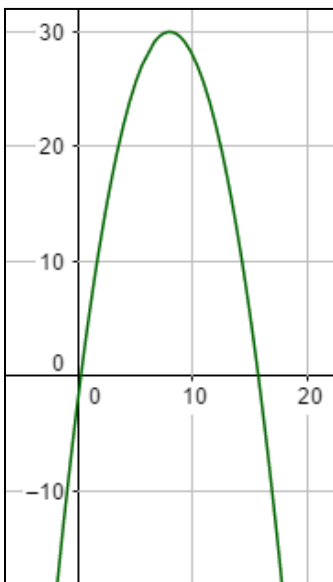
$$f(x) = -\frac{1}{2}x^2 + 8x - 2$$

**Axis of symmetry:**

$$x = -\frac{b}{2a} \rightarrow -\frac{8}{2(-\frac{1}{2})} = 8$$

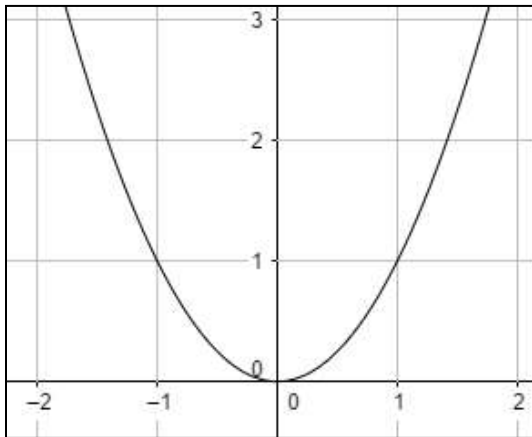
**Vertex:**

$$f(8) = -\frac{1}{2}(8)^2 + 8(8) - 2 = 30 = (8, 30)$$



**Unit 9 – Quadratic Functions & Their Properties** Test

6. Find the solution of the equation  $x^2 - 15 = -15$  by graphing the related function or mention if the equation has no solution.



**Solutions:  $x = 0$**

7. Find the solution of the equation  $2g^2 - 16 = -16$  by finding the square roots or mention if the equation has no solution.

$$2g^2 = 16 - 16 = 0$$

$$g^2 = 0$$

$$\sqrt{g^2} = \sqrt{0}$$

$$g = 0$$

8. Solve the equation  $(8t + 4)(3t + 6) = 0$

**By zero-product property:**

$$8t + 4 = 0 \quad \text{or} \quad 3t + 6 = 0$$

$$8t = -4 \quad ; \quad 3t = -6$$

$$t = -\frac{1}{2} \quad ; \quad t = -2$$

**Unit 9 – Quadratic Functions & Their Properties** Test

9. Solve the equation  $s^2 + 9s = -20$  by factoring.

**Factorize:**

$$s^2 + 9s + 20 = 0$$

$$s^2 + 4s + 5s + 20 = 0$$

$$s(s + 4) + 5(s + 4) = 0$$

$$(s + 4)(s + 5) = 0$$

$$s = -4 \quad ; \quad s = -5$$

10. Find the value of  $c$  which will make the expression a perfect-square trinomial.

$$p^2 - 10p + c$$

**Here the coefficient of linear term is  $-10$ .**

$$c = \left(\frac{-10}{2}\right)^2 = (-5)^2 = 25$$

**So, the trinomial is  $p^2 - 10p + 25$ .**

11. Solve the equation by completing the square.

$$x^2 + 8x - 9 = 0$$

**Here the term to add is  $\left(\frac{8}{2}\right)^2 = (4)^2 = 16$**

$$x^2 + 8x + 16 = 9 + 16$$

$$(x + 4)^2 = 25$$

$$x + 4 = \pm 5$$

$$x + 4 = 5 \quad ; \quad x + 4 = -5$$

$$x = 1 \quad ; \quad x = -9$$

**Unit 9 – Quadratic Functions & Their Properties** Test

12. Evaluate the discriminant of the equation and tell how many solutions the equation has and are the solutions real or imaginary.

$$y = -5x^2 + 6x - 4$$

$$\text{discriminant: } b^2 - 4ac = (6)^2 - 4(-5)(-4) = 36 - 80 = -44$$

Number of solutions: **2 since discriminant < 0**

Real or Imaginary: **Imaginary**

13. Solve the quadratic equation using the quadratic formula.

$$x^2 = 3x + 2$$

$$x^2 - 3x - 2 = 0$$

Here  $a = 1, b = -3, c = -2$

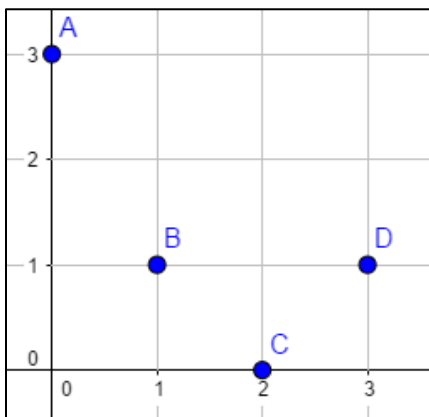
$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{+3 \pm \sqrt{9+8}}{2(1)}$$

$$x = \frac{+3 \pm \sqrt{17}}{2} \quad x = \frac{+3 + \sqrt{17}}{2} ; \quad x = \frac{+3 - \sqrt{17}}{2}$$

14. Graph the set of points and determine which model best represents the data set.

(0,3), (1,1), (2,0), (3,1)



## Unit 9 – Quadratic Functions & Their Properties Test

graph represents a **quadratic model**  
since the points make a U shaped curve.

15. The graph of the equation  $y = e^x$  is a/an:

- e. Straight line
- f. U-shaped curve
- g. Increasing curve**
- h. None of these