

Pre-Calculus 11 - VLN

Chapter 2: Quadratic Functions

Lesson 1: Graphing Quadratics Introduction

Question #1

Reference Q.45515

Graph $y = x^2$ and state the key features.

Question #2

Reference Q.11012

Graph the following quadratic function and state the key features:

$$y = -12x^2$$

Question #3

Reference Q.11013

Graph the following quadratic function and state the key features:

$$y = x^2 - 3.$$

Question #4

Reference Q.11014

Graph the following quadratic function and state the key features:

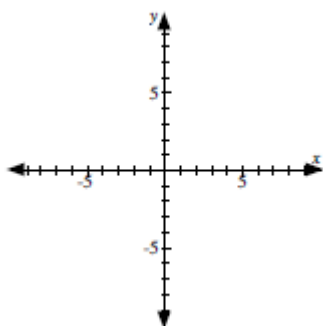
$$y = -2x^2 + 6.$$

Question #5

Reference Q.13704

Consider the graph of the function $f(x) = (x - 2)^2 + 3$

- a. Sketch the graph on the grid.



- b. State the coordinate of the vertex.
c. State the maximum or minimum value of the function.
d. State the domain and range of the function.

Question #6

Reference Q.11015

Graph the following quadratic function and state the key features:

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

Question #7

Reference Q.13703

Describe how the graphs of the following functions relate to the graph of $y = x^2$.

- a. $y = (x + 5)^2$
- b. $y = x^2 - 7$
- c. $y - 8 = x^2$
- d. $y = 5 + (x - 2)^2$
- e. $y + 7 = (x + 1)^2 - 10$
- f. $y = (x - a)^2 - b$

Question #8

Reference Q.13705

The following transformations are applied to the graph of $y = x^2$. Write the equations of the image function for each.

- a. a horizontal translation of 7 units right
- b. a vertical translation of 2 units down
- c. a translation 3 units left and 8 units up
- d. a translation **c** units down and **d** units right

Question #9

Reference Q.13733

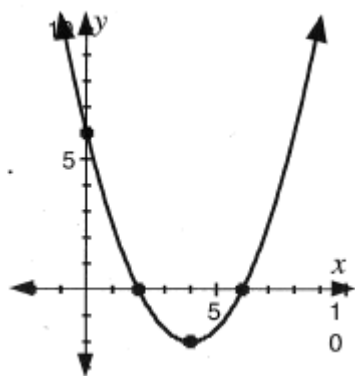
Which of the following transformations shifts the graph of $y = x^2$ to the graph of $y + a = (x - b)^2$?

- A. **a** units right and **b** units down
- B. **b** units right and **a** units down
- C. **b** units up and **a** units right
- D. **a** units down and **b** units left

Question #10

Reference Q.13731

The domain and range, respectively, of the function are



- A. $x \in \mathbb{R}$ and $y \in \mathbb{R}$
- B. $x \geq -2$ and $y \in \mathbb{R}$
- C. $x \in \mathbb{R}$ and $y \geq -2$
- D. $2 \leq x \leq 6$ and $y \geq -2$

Reminder: $x \in \mathbb{R}$ means: "x is in the set of all real numbers".

Question #11

Reference Q.13729

Write the **i**) coordinates of vertex, **ii**) max/min value, **iii**) equation of axis of symmetry, **iv**) the domain and **v**) the range for each quadratic function below.

- a. $y = x^2 + 5$
- b. $y = (x + 3)^2 - 4$
- c. $y + 9 = (x - 6)^2 + 1$
- d. $y - w = (x + r)^2$

Question #12

Reference Q.13730

After a combination of a horizontal and a vertical translation, the graph of $y = x^2$ has an image graph with a vertex at $(2, -6)$. Describe the translations

Question #13

Reference Q.13706

Write the coordinates of the image of the point $(-2, 4)$ on the graph $y = x^2$ when each of the following transformations is applied:

- a. a horizontal translation of 2 units to the left
- b. a translation of 3 units up and 11 units right

Question #14

Reference Q.13734

The function defined by the equation $y = x^2$ is transformed to $y = (x + 2)^2 + 4$. If the point $(2, 4)$ lies on the graph of $y = x^2$, which of the following points must lie on the graph of $y = (x + 2)^2 + 4$?

- A. $(0, 0)$
- B. $(4, 0)$
- C. $(4, 8)$
- D. $(0, 8)$

Question #15

Reference Q.13709

Complete the following table.

Function	Vertex	Max/Min Value	Equation of Axis of Symmetry	Domain	Range
$y = 3x^2$					
$y = 2x^2 + 1$					
$y = -(x + 7)^2$					
$y - 10 = (x + 5)^2$					
$y + 3 = -3(x - 1)^2 + 2$					

Reminder: $x \in \mathbb{R}$ means: "x is in the set of all real numbers".

Question #16

Reference Q.11016

Graph the following quadratic function and state the key features:

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

Question #17

Reference Q.13711

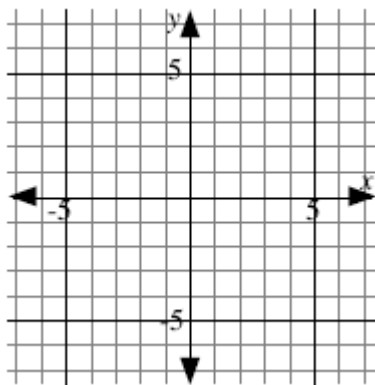
The graph of $f(x) = x^2$ undergoes a series of transformations.

- a. State the transformations applied to the graph of $f(x) = x^2$ which would result in the graph of

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

- b. Without using a graphing calculator, sketch the graph of

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



- c. Verify using a graphing calculator.

Question #18

Reference Q.13713

Write the equation of a quadratic function which is the image of

$y = x^2$ after a vertical stretch about the x -axis by the given factor of a , and after a translation which results in the given vertex.

- $a = 3$, vertex $(4, -1)$
- $a = \frac{1}{2}$, vertex $(-3, 2)$
- $a = -4$, vertex $(0, 5)$
- $a = -\frac{1}{3}$, vertex $(-6, -3)$

Question #19

Reference Q.13710

The following transformations are applied, **in order**, to the graph of $y = x^2$.

- a reflection in the x -axis
 - a vertical stretch of factor 3 about the x -axis
 - a translation of 5 units right and 2 units down
- Find the equation of the image function after each transformation.
 - At the end of all transformations, the point $(4, y)$ is on the final graph of the parabola. Find the y -coordinate for the final graph when $x = 4$.

Question #20

Reference Q.13716

The following transformations are applied, in order, to the graph of $y = x^2$.

- a vertical stretch of factor 2 about the x -axis
- a reflection in the x -axis
- a vertical translation of 12 units up

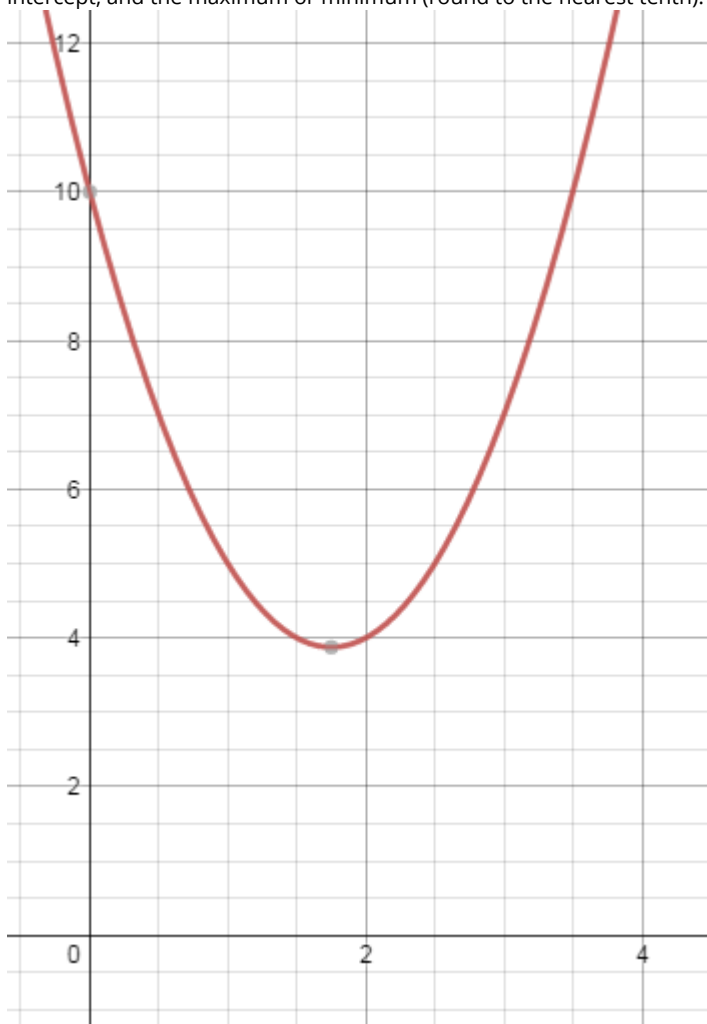
At the end of all the transformations, the point $(2, y)$ is on the final graph of the parabola.

The value of y , to the nearest tenth, is ____.

Question #21

Reference Q.11023

Below is the graph of $2x^2 - 7x + 10$. Find the x-intercept(s), the y-intercept, and the maximum or minimum (round to the nearest tenth).



- x-intercept(s)
- y-intercept
- minimum

Question #22

Reference Q.13707

Describe how the graphs of the following functions relate to the graph of $y = x^2$.

- $y = -3x^2$
- $y = x^2 - 15$
- $y = -\frac{2}{3}(x + 4)^2 - 1$
- $2y = (x - 8)^2 + 12$

Question #23

Reference Q.13708

The following transformations are applied to the graph of $y = x^2$ in the order given.

Write the equation of the image function for each.

- A reflection in the x -axis and a vertical stretch by a factor of 4 about the x -axis.
- A vertical stretch by a factor of $\frac{3}{5}$ about the x -axis, and a translation of 5 units down.
- A vertical stretch by a factor of 8 about the x -axis, a reflection in the x -axis, a vertical translation of 3 units up, and a horizontal translation 9 units left.
- A vertical stretch by a factor of c about the x -axis, a reflection in the x -axis, and a translation of e units right and f units down.

Question #24

Reference Q.13712

Write the coordinates of the image of the point $(-3, 9)$ on the graph $y = x^2$ when each of the following transformations are applied:

- a reflection in the x -axis, followed by a vertical translation of 4 units up
- a vertical stretch by a factor of $\frac{1}{3}$ about the x -axis

Question #25

Reference Q.13714

The quadratic function $f(x) = x^2$ is transformed to

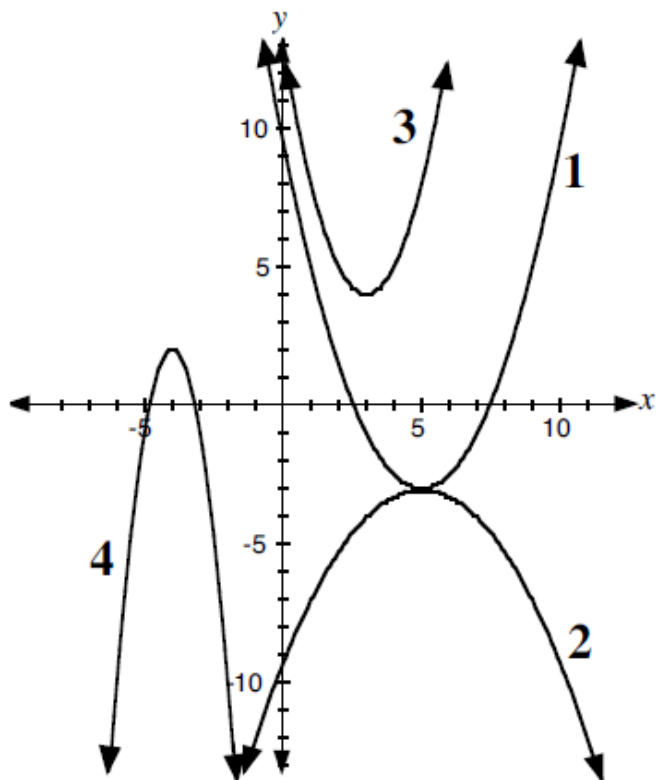
$$f(x) = -\frac{1}{2}(x + 3)^2 + 1.$$

The point $(1, 1)$ on the graph of $y = x^2$ is transformed to which point on the graph of $y = -\frac{1}{2}(x + 3)^2 + 1$?

- $\left(-2, \frac{1}{2}\right)$
- $\left(-2, \frac{3}{2}\right)$
- $(-2, -1)$
- $\left(\frac{5}{2}, 2\right)$

🔍 **Question #26**

Reference Q.13715



The diagram shows the graphs four quadratic functions.

In the first box, write the number corresponding to the graph of

$$y = \frac{1}{2}(x - 5)^2 - 3.$$

In the second box, write the number corresponding to the graph of

$$y = -3(x + 4)^2 + 2.$$

In the third box, write the number corresponding to the graph of

$$y = (x - 3)^2 + 4.$$

In the last box, write the number corresponding to the graph of

$$y + 3 = -\frac{1}{4}(x - 5)^2.$$