

Unit 1, Function Transformations

Worksheet 1

Q1

What vertical translation is applied to $y = x^2$ if the transformed graph passes through the point (4, 19)?

Q2

The graph of the function drawn in red is a translation of the original function drawn in blue. Write the equation of the translated function in the form $y - k = f(x - h)$.

Q3

The graph of the function $y = x^2$ is translated to an image parabola with zeros 7 and 1.

- Determine the equation of the image function.
- Describe the translations on the graph of $y = x^2$.
- Determine the y-intercept of the translated function.

Q4

Sketch the graph of $f(x) = |x|$ reflected in each line.

- $x = 3$
- $y = -2$

Q5

Two parabolic arches are being built. The first arch can be modelled by the function $y = -x^2 + 9$, with a range of $0 \leq y \leq 9$.

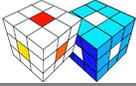
The second arch must span twice the distance and be translated 6 units to the left and 3 units down.

- Sketch the graph of both arches.
- Determine the equation of the second arch.

Q6

If the x-intercept of the graph of $y = f(x)$ is located at $(a, 0)$ and the y-intercept is located at $(0, b)$, determine the x-intercept and y-intercept after the following transformations of the graph of $y = f(x)$.

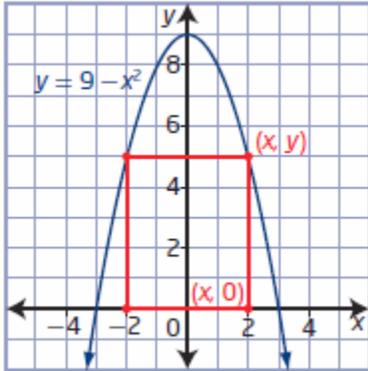
- $y = -f(-x)$
- $y = 2f(1/2 x)$
- $y + 3 = f(x - 4)$



d) $y + 3 = 1/2 f(1/4 (x - 4))$

Q7

A rectangle is inscribed between the x-axis and the parabola $y = 9 - x^2$ with one side along the x-axis, as shown.



a) Write the equation for the area of the rectangle as a function of x .

b) Suppose a horizontal stretch by a factor of 4 is applied to the parabola. What is the equation for the area of the transformed rectangle?

c) Suppose the point $(2, 5)$ is the vertex of the rectangle on the original parabola. Use this point to verify your equations from parts a) and b).