

Name: \_\_\_\_\_

Student #: \_\_\_\_\_

Date: \_\_\_\_\_

T.A. #: \_\_\_\_\_

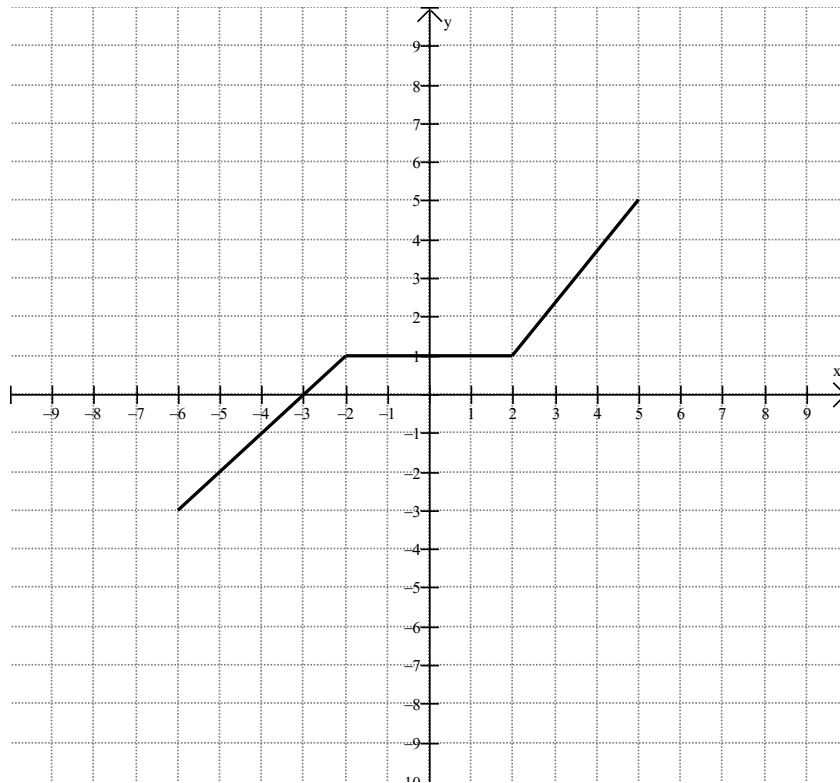
**Mathematics 12 Pre-Calculus  
LEARNING GUIDE 2 TEST – TRANSFORMATIONS**

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**\*Full marks may NOT be given for the final answer only.**

When using a calculator, you should provide a decimal answer that is correct **to at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.

1. Using the graph of  $y = f(x)$  below, sketch and label the graphs of: (2 marks)
  - a)  $f(x - 1) - 1$
  - b)  $f(-2x)$



2. Give the location of any invariant point(s) in the transformations you did in #1b. (1 mark)

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3. Describe what happens to the graph of a function if you make each change to its equation:

(2 marks each)

a) replace  $y$  with  $-y$ , then replace  $x$  with  $x - 4$ .

b) replace  $x$  with  $x + 1$  and  $y$  with  $y + 5$ .

c) replace  $x$  with  $2x$  and  $y$  with  $\frac{1}{3}y$ .

d) replace  $x$  with  $-\frac{1}{2}x$  and  $y$  with  $3y$ , then  $y$  with  $y + 1$

4. Describe what happens to the equation of a function if you make each change to its graph:

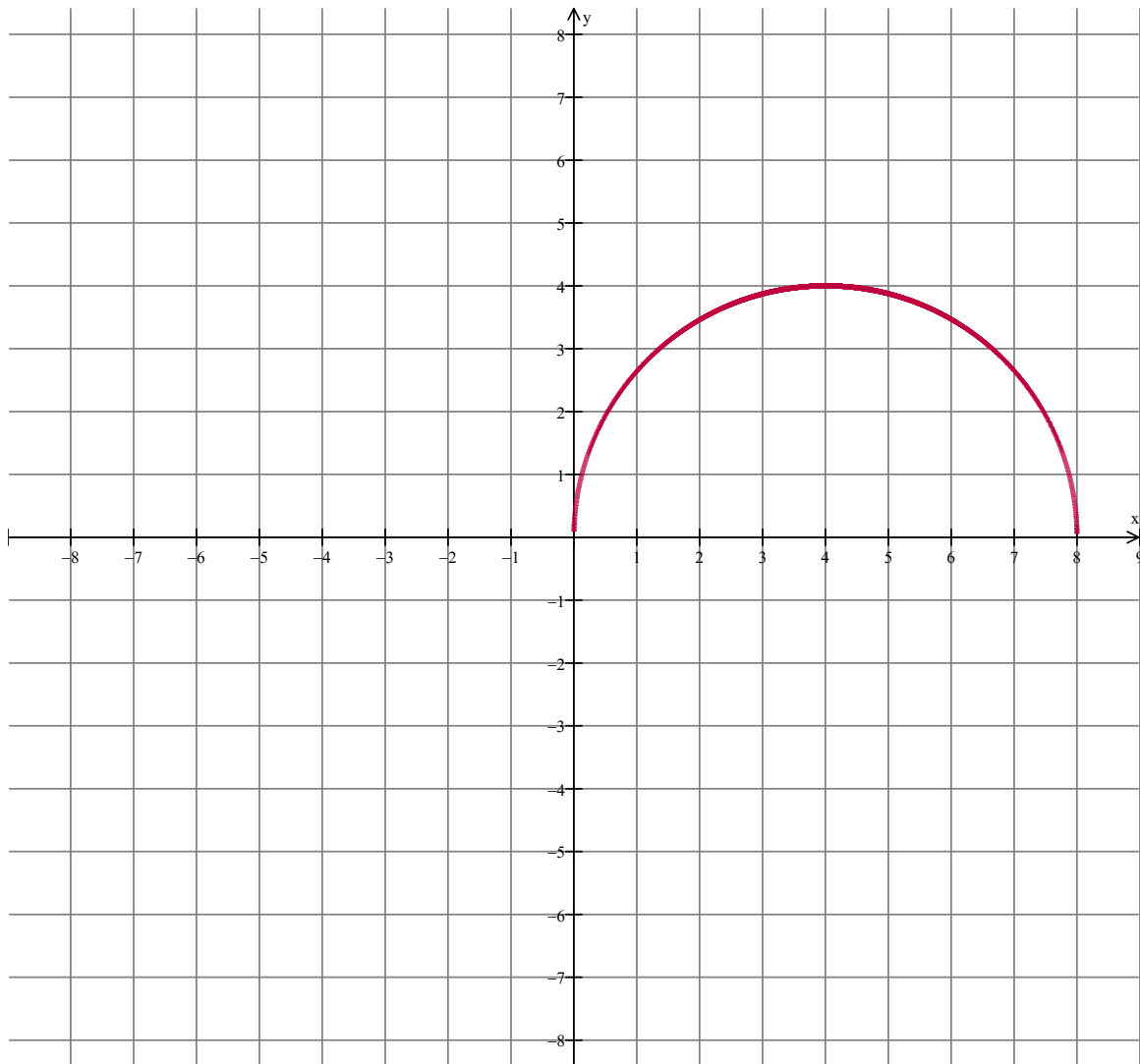
(2 marks each)

a) reflect the graph about the line  $y = x$ .

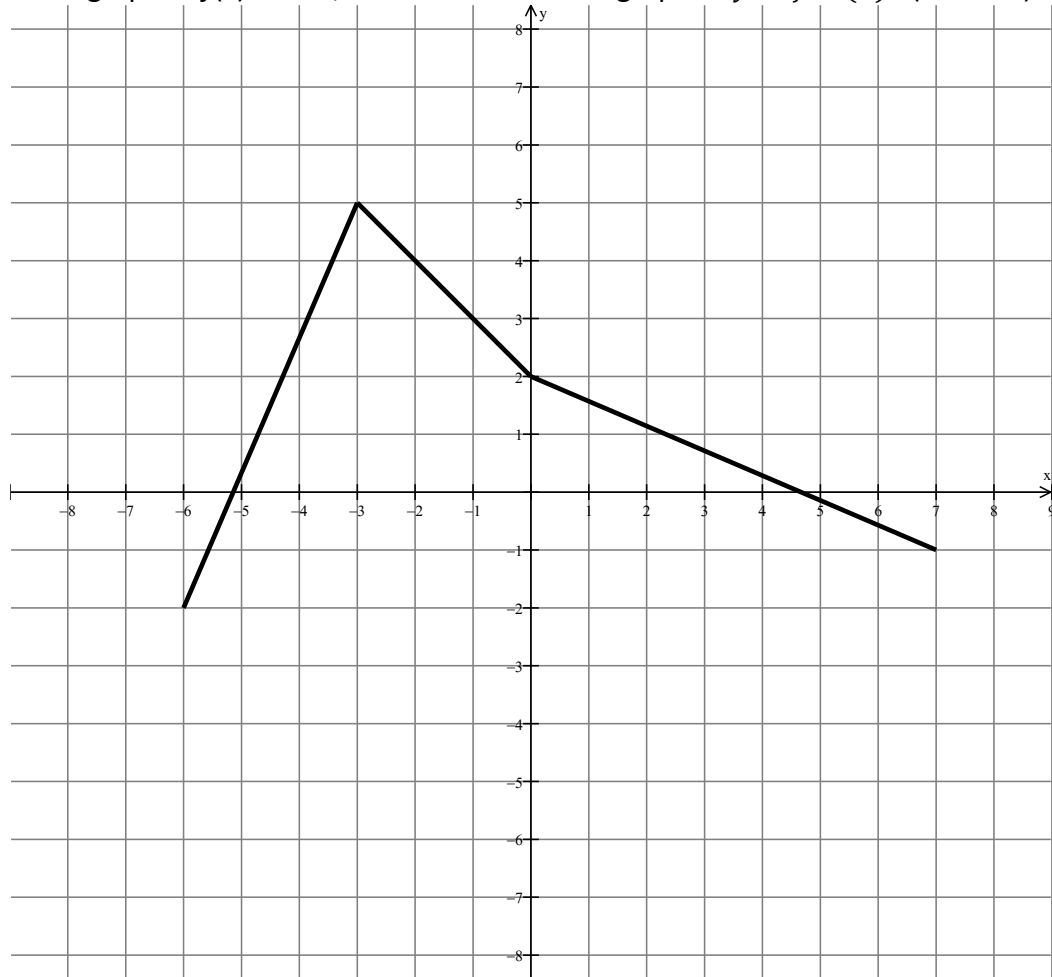
b) stretch (expand) vertically by a factor of 3 and then move down 3.

c) stretch (compress) vertically by a factor of  $\frac{1}{5}$  and translate 2 units right.

5. Given the graph of  $y = f(x)$ , sketch the graph of  $y = f(-2x) + 3$ . (2 marks)



6. a) Given the graph of  $f(x)$  below, sketch and label the graph of  $y = f^{-1}(x)$ . (3 marks)



b) How do you tell by looking at the graph of  $f(x)$  that the inverse will not be a function? (1 mark)

c) How could you restrict the domain of  $f(x)$  so that the inverse would be a function? (1 mark)

7. What is the inverse of the relation  $y = \frac{x-2}{3}$ ?

(2 marks)

8. If  $(-6, 3)$  is a point on the graph of  $y = f(x)$ , what must be a point on the graph of  $y = 2f(-x) - 1$ ?

(2 marks)

9. Give the equation of the new relation if the graph of  $y = x^2 - x + 1$  were stretched (expanded) vertically by a factor of 2, stretched (compressed) horizontal by a factor of  $\frac{1}{2}$  and moved down 1. (2 marks)