LG 1 Ver B

Name: _____ Student #:_____

Date:_____ T.A. #:_____

Mathematics 12 Pre-Calculus
LEARNING GUIDE 1 TEST – TRANSFORMATIONS PART A

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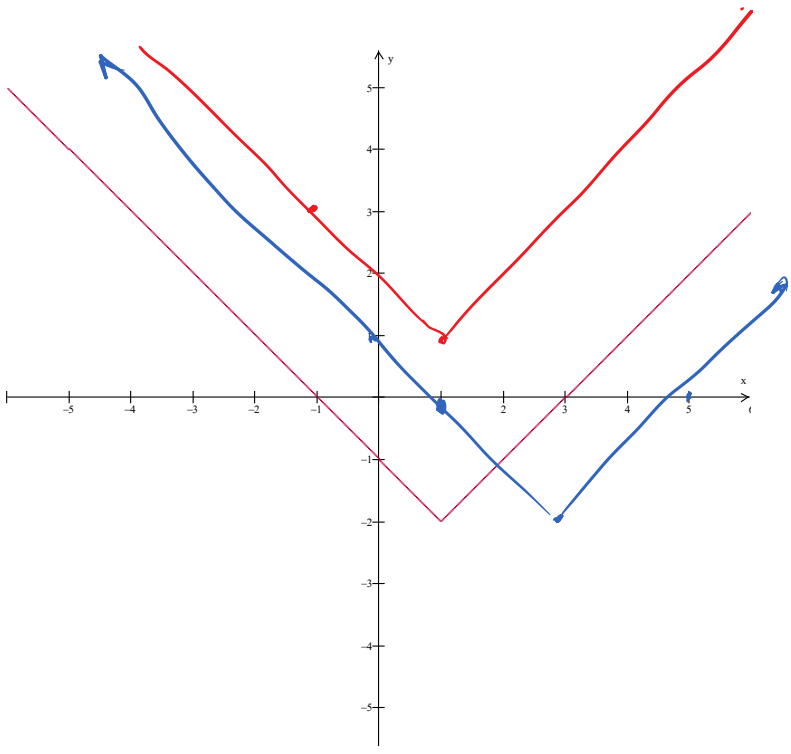
***Full marks will NOT be given for the final answer only.**

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. Describe how the graph of $y = x^2$ compares to the graph of $y = (x + 5)^2$. (1 mark)

LEFT 5

2. Using the graph of $y = f(x)$ below, sketch and label the graphs of: (2 marks)
   a) $f(x) + 3$
   b) $f(x - 2)$



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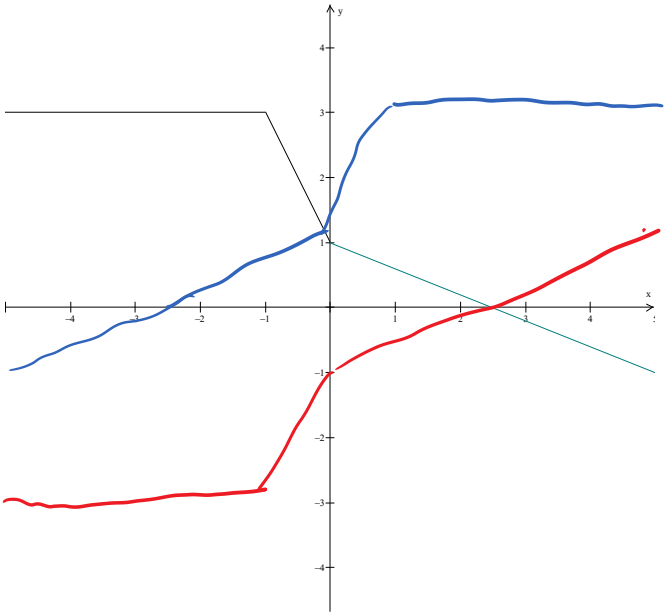
3. The graph of a function $y = f(x)$ is translated 7 units left and 4 units down. The equation of its image has the form $y = f(x - c) + d$. Determine the value of c and d. (2 marks)

c= −7

d= −4

4. Given the graph of the function $y = f(x)$ below. Sketch and label the graphs of the following: (2 marks)
   a) $-f(x)$
   b) $f(-x)$



5. Describe what happens to the graph of a function if you make each change to its equation:
   a) replace x with $-x$. (1 mark each)

REFLECT y

   b) replace x with $x + 1$ and y with $y - 4$.

LEFT 1 UP 4

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c) replace x with $5x$.

HC BARS $\frac{1}{5}$

e) replace x with $-\frac{1}{2}x$ and y with $2y$

REFLECT y, HS BARS 2, VC BARS $\frac{1}{2}$

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

a) reflect the graph in the y-axis. (1 mark each)

$x \to -x$

or $y = f(-x)$

b) reflect the graph in both axis.

$x \to -x$ $y \to -y$

or $y = -f(-x)$

c) compress vertically by a factor of $\frac{1}{3}$ and reflect in the x axis.

$y \to 3y$ $x \to -y$

or $y = -\frac{1}{3}f(x)$

d) expand horizontally by a factor of $\frac{3}{2}$.

$x \to \frac{2}{3}x$

or $y = f(\frac{2}{3}x)$

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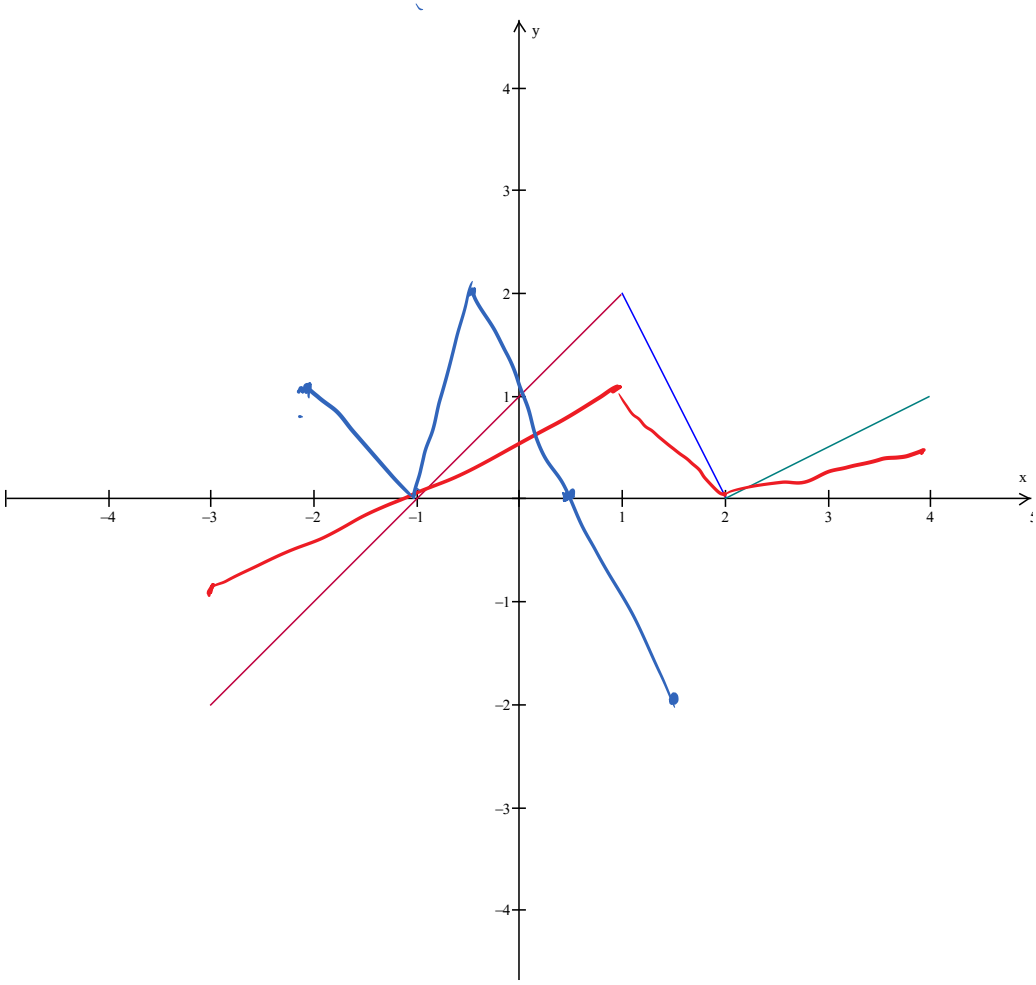
7. Given the graph of the function $y = f(x)$, sketch the graphs of:
   a) $y = \frac{1}{2}f(x)$ (1 mark)
   b) $y = f(-2x)$ (2 marks)



8. Give the location of the invariant points: (2 marks)
   a) In the transformation you did in 7a.

(−1, 0) (2, 0)

   b) In the transformation you did in 7b.

(0, 1)

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