

MHF4U: Test – Functions: Understanding Rates of Change REVIEW

Name: _____

Mark: KU APP COMM

1. Describe the transformation and state the mapping that will transform $y = f(x)$ to [COMM / 5]

A) $y = -3f\left(\frac{1}{2}x\right)$

Description:

[2]

Mapping Notation: $(x, y) \rightarrow$

B) $y = -2f(2x - 6)$

Description:

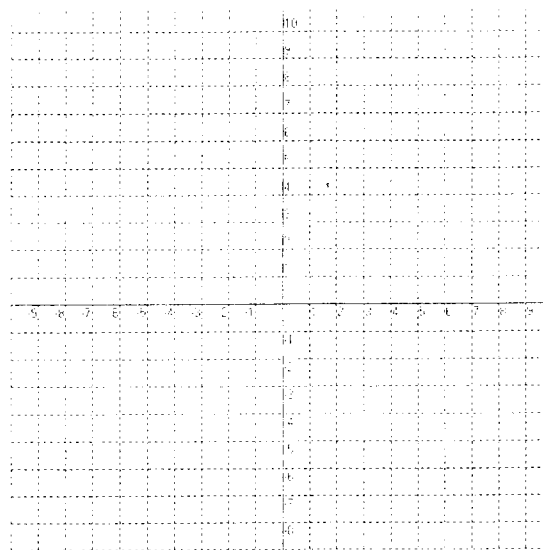
[3]

Mapping Notation: $(x, y) \rightarrow$

2. Determine the equation of the function if $y = \sqrt{x}$ is transformed to the right 3 units, reflected over the y-axis and vertically stretched by a factor of 2. [APP/2]

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

A) Sketch both $f(x)$ and $f^{-1}(x)$ in the space provided. [APP/4]



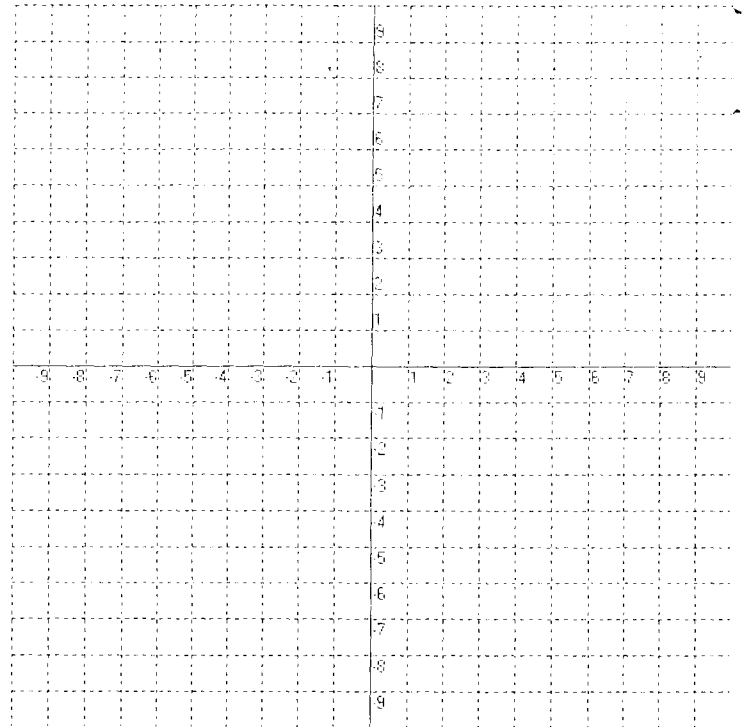
B) From the graph above, determine the domain and range of $f^{-1}(x)$. [KU/1]

C) Determine the equation for $f^{-1}(x)$. [APP/3]

4. Sketch the following functions in the space provided. [KU/10]

Equation	Transformation/Mapping	Graph
$y = - 2x + 6$		
$y = (\frac{1}{2}x - 2)^3 - 4$		
$y = -2x^2 - 8x - 3$		

5. Sketch the piecewise function $f(x)$ on the graph given: [KU/5] $f(x) = \begin{cases} -2x, & x < -4 \\ 3, & -4 \leq x < 2 \\ x^3 - 3, & x \geq 2 \end{cases}$



6. Determine the value of " k " so that the piecewise function $f(x)$ is "continuous" throughout its domain? [APP/2]

$$f(x) = \begin{cases} x^2 + 4x + k, & x < -3 \\ \frac{2}{3}x + 4, & x \geq -3 \end{cases}$$

7. Estimate the instantaneous rate of change for the function $f(x) = x^3 + 2x$ at $x = -2$ using the difference-quotient method. Is the function increasing or decreasing when $x = -2$? [KU4]

8. An automobile enters a road and travels the following distance in metres during the next 10 seconds, where s represents the distance in metres and t time in seconds.

t	0	2	4	6	8	10
s	0	7	16	27	40	55

- A) Determine the average rate of change (speed) of the vehicle over the first 40 metres? [KU2]
- B) Estimate the Instantaneous rate of change of the vehicle when $t = 4$ seconds using the "Preceding/Following" Method. [KU4]
- C) If the points above satisfy the equation $s = at^2 + bt$, determine a and b then calculate the speed of the car when $t = 18.5$ seconds. (Use any Method) [A6]