**Gonzaga 2013 Math 3200 - Chapter 1: Function Transformations**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Part A: Multiple Choice (15 marks)***

***\_\_\_\_\_***1. The function $y=f(x)$ is transformed to $y=f(x+3)$. How is the image transformed?

A) translated 3 units to the right of $y=f(x)$

B) translated 3 units above $y=f(x)$

C) translated 3 units below $y=f(x)$

D) translated 3 units to the left of $y=f(x)$

\_\_\_\_\_2. The graphs of $y=f\left(x\right) and y=g(x)$ are shown below. Which mapping rule would map $y=f\left(x\right)$ onto $y=g(x)$?

|  |  |
| --- | --- |
|  |  |
|  |  |  |
|  | A) | $$\left(x,y\right)\rightarrow \left(x+2,-2y-1\right)$$ |
|  | B) | $$\left(x,y\right)\rightarrow \left(x-2,-2y-1\right)$$ |
|  | C) | $$\left(x,y\right)\rightarrow \left(x+2,-2y+2\right)$$ |
|  | D) | $$\left(x,y\right)\rightarrow \left(x-2,-2y+2\right)$$ |
|  |  |  |

\_\_\_\_\_3. If $y$ is replaced by $\frac{1}{2}y$ in the equation $y=f(x)$, the graph of $y=f(x)$ will be stretched

A) horizontally by a factor $\frac{1}{2}$

B) vertically by a factor of 2

C) horizontally by a factor of 2

D) vertically by a factor of $\frac{1}{2}$

\_\_\_\_\_4. Given the graph of $y=f(x)$ below, what would the image point of (3,0) be for the transformed graph $y=f(-x)$?

 A) (-3,0) B) (0,3) C) (3,0) D) (0,-3)

\_\_\_\_\_5. The graph of $y=f(x)$ is reflected in the *x*-axis, horizontally stretch by a factor of 2, translated 3 units to the left, and 1 unit down. What is the equation of the transformed graph?

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

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

C) $y=-f\left(2(x-3)\right)-1$

D) $y=-f\left(2(x+3)\right)-1$

\_\_\_\_\_6. What is the mapping rule when $y=f(x)$ is transformed to $y=2f\left(-(x+1)\right)-4$?

A) $\left(x,y\right)\rightarrow (x-1,2y-4)$

B) $\left(x,y\right)\rightarrow (-x-1,\frac{1}{2}y+4)$

C) $\left(x,y\right)\rightarrow (-x-1,2y-4)$

D) $\left(x,y\right)\rightarrow (x-1,\frac{1}{2}y+4)$

\_\_\_\_\_7. Which 2 functions are inverses of each other?

$f\left(x\right)=\frac{x+6}{4}$ $g\left(x\right)=\frac{x-6}{4}$ $h\left(x\right)=4x-6$

 A) *f* and *g* B) *f* and *h* C) *g* and *h* D)none are inverses

\_\_\_\_\_8. What is the new equation if graph A is transformed to graph B?



A) $x=f(y)$ B) $x=-f(y)$ C) $y=-f(x)$ D) $y=f(-x)$

\_\_\_\_\_9. The graph of $y=f(x)$ contains the point (3,4). Which of the following equations describe the transformations whereby (3, 4) (5, 5)?

 A) $y+1=f(x+2)$ B) $y+1=f(x-2)$

C) $y-1=f(x+2)$ D) $y-1=f(x-2)$

\_\_\_\_\_10. Which of the following transformations to the graph of $y=f(x)$ would have the x-intercepts as invariant points?

 A) $y=f\left(x\right)+2$ B) $y=f(x+2)$

C) $y=f-(x)$ D) $y=-f(x)$

\_\_\_\_\_11. What is the equation of the inverse function for $y=x^{2}+1, x\geq 0?$

 A)$ y=1+\sqrt{x}$ B) $y=1-\sqrt{x}$

C)$ y=\sqrt{x-1}$ D) $y=\sqrt{x+1}$

\_\_\_\_\_12. The function $y=f(x)$ is transformed to $y=2f(x-3)$. If the original domain is

 $\left\{x/-4\leq x\leq 2,x ϵ R\right\}$, what is the domain of the transformed function?

 A) $\left\{x/-7\leq x\leq 2,x ϵ R\right\}$ B) $\left\{x/-1\leq x\leq 5,x ϵ R\right\}$

C) $\left\{x/-8\leq x\leq 4,x ϵ R\right\}$ D) $\left\{x/-2\leq x\leq 1,x ϵ R\right\}$

\_\_\_\_\_13. What are the zeros of the function  after the transformation
 ?

 (A) 
(B) 
(C) 
(D) 

\_\_\_\_\_14. Given the graph of $y=f(x)$, which of the following represents the graph of $y=f(-x-6)$?



 A) B)

 C) D)

\_\_\_\_\_15. What is the line of reflection if graph A is transformed to graph B?

 A) $y=x$

 B)$ y=0$

C) $x=0$

D) $y=-x$

***Part B: Long answer questions. Show all workings to receive full marks. (14 marks)***

16. Given $y=f(x)$, state the mapping rule and sketch $y=-\frac{1}{2}f\left(2x+4\right)+1$. (4 marks)

Mapping Rule:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Graph B is a transformation of graph A. Determine the equation of graph B in the form $y=af\left(b\left(x-h\right)\right)+k$ . (5 marks)

18. **Restrict the domain** of the function $f\left(x\right)=\frac{1}{2}(x+1)^{2}+4$ so that it's inverse will also be a function. **Find the inverse equation** and **state its domain**. (5 marks)