

TRANSFORMATIONS [1.3]

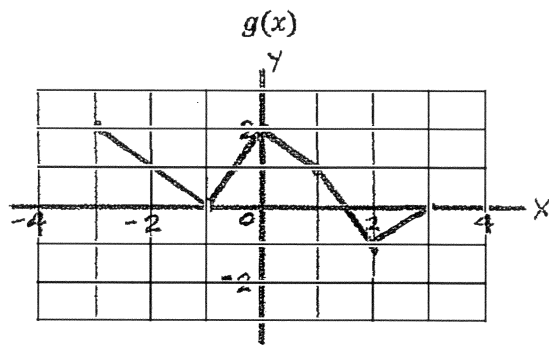
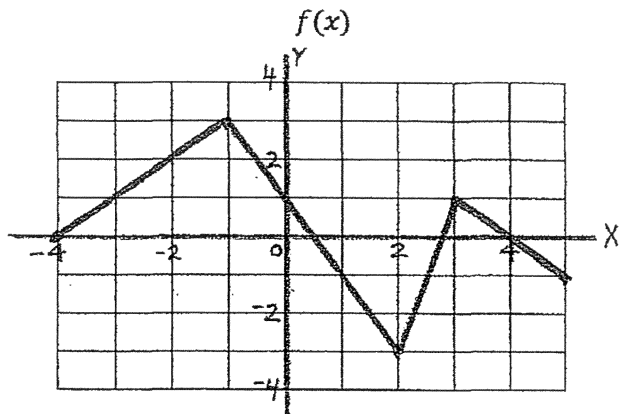
- Let $T = f(K)$ be the time it takes, in years, for K kilograms of a radioactive substance to decay to 10% of its original amount. Explain fully what the following quantities represent?
 - $f(132)$ represents _____

 - $f^{-1}(52)$ represents _____

- For each student in this class, let the student's height (H) be a function of his number (N) in my gradebook.
 - Is this function one-to-one? _____ Why? _____
 - Is this function invertible? _____ Why? _____
- Consider the function $y = h(x) = 3x + 2$. Is this function invertible? _____ If so, then determine the equation of its inverse function. SHOW ALL WORK.
- Is the function $f(t) = 2^t$ invertible? _____ If it is invertible, then determine the equation of its inverse function.
- Suppose the point $(7, -2)$ is on the graph of $y = f(x)$. Find the corresponding point on the following transformations of f .
 - $y = f(x) + 3$
 - $y = f(x + 2)$
 - $y = \frac{1}{3}f(x)$
 - $y = f(2x)$
 - $y = 2(x - 1)$
 - $y = -f(x)$
 - $y = f(-x)$
 - $y = f(-x) - 4$

6. Are the following functions *even*, *odd*, or *neither*.
- (a) $g(z) = z^4 - z$ _____
- (b) $d(x) = 8x^3 + x$ _____
- (c) $q(m) = m^{-2} + m^4 + 1$ _____
7. Give three properties of an *even function*:
- (a)
- (b)
- (c)
8. Give three properties of an *odd function*:
- (a)
- (b)
- (c)
9. Suppose the point $(-9, 2)$ is on the graph of $y = f(x)$. Use this point to answer the questions below.
- (a) If f is an odd function, find another point on the graph of $y = f(x)$.
- (b) If f is an even function, find another point on the graph of $y = f(x)$.
- (c) If f is invertible, find another point on the graph of $y = f^{-1}(x)$.
10. Let $g(w) = w^2 + 7$ and let $h(w) = 3w - 1$. Determine the function $f(w)$ such that $f(w) = g(h(w))$. SIMPLIFY YOUR ANSWER.
11. Let $p(x) = 2^x$ and let $q(x) = -x + 1$. Determine the function $r(x)$ such that $p(x) = q(r(x))$. SHOW ALL WORK.
12. Express the volume, V , of a cylinder as a function of its height, h , if its height is 3 times the radius. SHOW ALL WORK AND SIMPLIFY YOUR ANSWER.

13. Use the graphs below to answer the questions there.



- (a) $g(f(3)) =$ _____
- (b) $f(g(0)) =$ _____
- (c) $(g - f)(2) =$ _____
- (d) $(f \cdot g)(-1) =$ _____

IF YOU ARE HAVING DIFFICULTY WITH ANY OF THESE PROBLEMS, THEN PLEASE COME IN TO SEE ME DURING MY OFFICE HOURS: MTL 124(C)

[1.3] TRANSFORMATIONS OUTLINE

- I. SHIFTS OF $f(x)$
 - A. Vertical
 - B. Horizontal

- II. STRETCHES OF $f(x)$
 - A. Vertical
 - B. Horizontal

- III. REFLECTIONS OF $f(x)$
 - A. Vertical
 - B. Horizontal

- IV. COMPOSITE FUNCTIONS

- V. INVERTIBLE FUNCTIONS – PROPERTIES
 - A.
 - B.
 - C.
 - D.
 - E.

- VI. EVEN FUNCTIONS – PROPERTIES
 - A.
 - B.
 - C.

- VII. ODD FUNCTIONS – PROPERTIES
 - A.
 - B.
 - C.

- VI. COMPOSITE FUNCTIONS