

Math 151 - Test 2

March 16, 2016

Name _____

Score _____

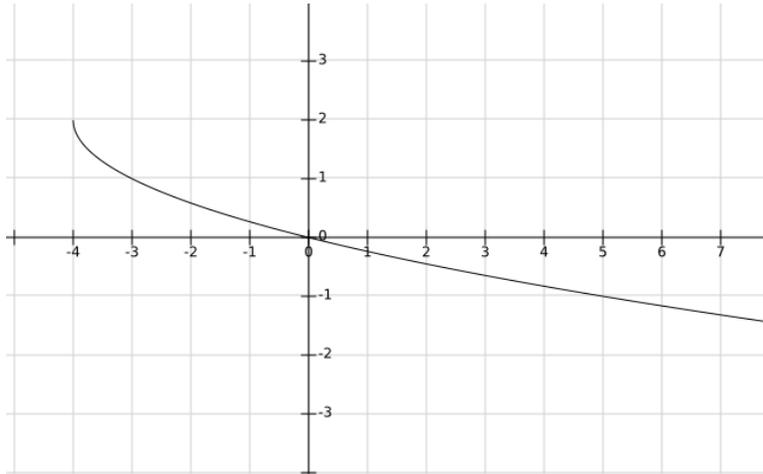
Show all work. Supply explanations where necessary.

1. (6 points) Let $f(x) = 3x^2 - 8x + 1$ and $g(x) = x^2 + 8x - \sqrt{x}$.(a) Find and simplify a formula for $(f + g)(x)$.(b) Evaluate $(f + g)(4)$.(c) Determine the domain of $f + g$.2. (8 points) Some values of the functions f and g are given in the table below. Use the data from the table to evaluate each of the following.

x	1	2	3	4	5
$f(x)$	-1	3	-2	5	0
$g(x)$	7	0	4	-7	-2

(a) $(fg)(3)$ (b) $\left(\frac{g}{f}\right)(5)$ (c) $(f + f)(4)$ (d) $(f \circ g)(3)$

3. (4 points) Let $g(x) = 3x - 5$. Using the function g and the graph of $y = f(x)$ shown below, compute each of the following.



(a) $(g - f)(5)$

(b) $(f + g)(-3)$

4. (6 points) Let $f(x) = x^2 + 3x - 5$ and $g(x) = x - 4$.

(a) Find and simplify the formula for $(f \circ g)(x)$.

(b) What is the domain of $(f \circ g)$?

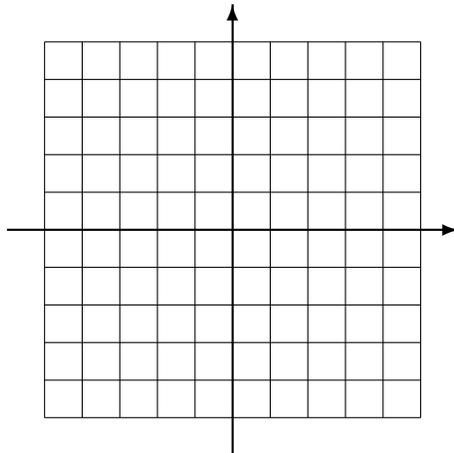
5. (4 points) Find two functions f and g so that $(f \circ g)(x) = \sqrt[5]{2x^3 + 7}$.

6. (4 points) Let $f(x) = \sqrt{x}$ and $g(x) = 2x + 1$. Evaluate each of the following.

(a) $(f \circ g)(4)$

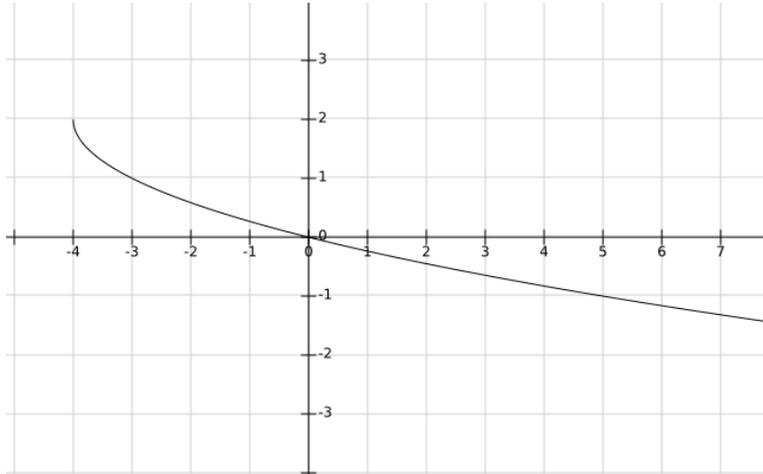
(b) $(g \circ f)(9)$

7. (4 points) Sketch the graph of a function that is NOT one-to-one. Explain why it is not.



8. (8 points) Find the inverse of $g(x) = 1 + \sqrt{x - 2}$. Be sure to state the domain of g^{-1} .

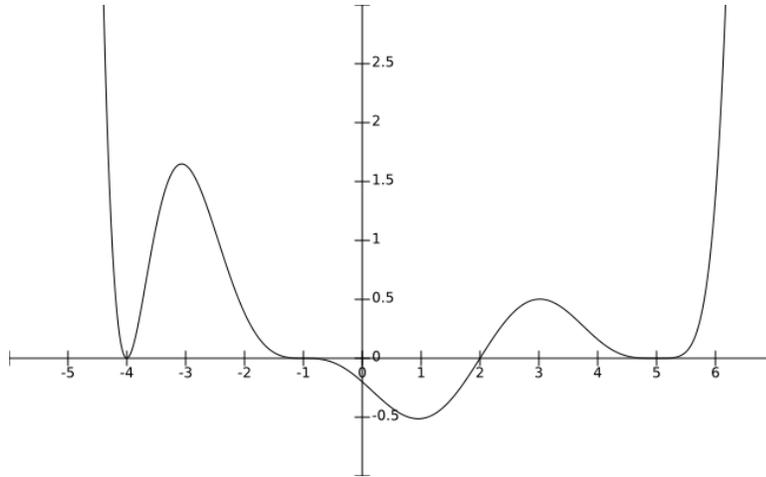
9. (2 points) The graph of $f(x)$ is shown below. Use the graph to determine $f^{-1}(1)$.



10. (6 points) Use compositions to show that $f(x) = 6 - \sqrt[3]{x}$ and $g(x) = (6 - x)^3$ are inverses.

11. (4 points) Let $f(x) = (x - 2)^2 - 7$. Find the domain of f^{-1} .

12. (10 points) The graph of a polynomial is shown below.



- (a) Is the degree even or odd?

- (b) Is the leading coefficient positive or negative?

- (c) Which zeros have multiplicity one?

- (d) Which zeros have even multiplicity?

- (e) Which zeros have odd multiplicity greater than 1?

13. (12 points) Consider the polynomial $f(x) = -x(x - 2)^3(2x + 1)^2$.

(a) Determine the degree of f and the leading coefficient.

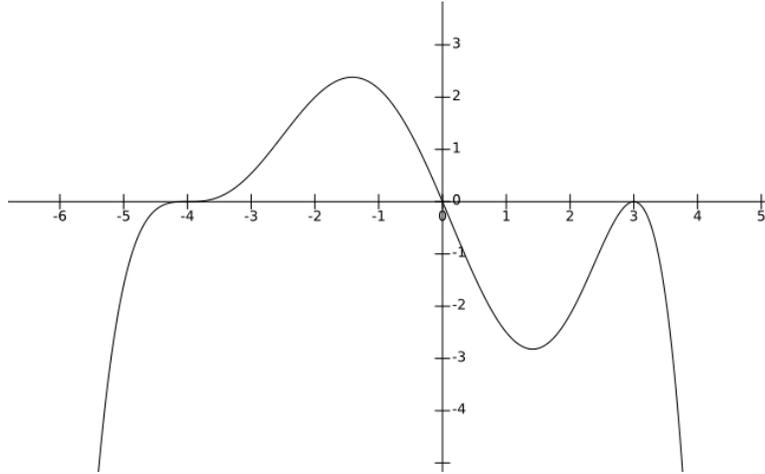
(b) State the zeros of f and their corresponding multiplicities.

(c) Describe the end behavior of the graph of f . (A picture or diagram will work!)

(d) Determine the y -intercept.

(e) Roughly sketch the graph of f . Be sure that your graph correctly illustrates the y -intercept, the end behavior, and the behavior near the x -intercepts.

14. (8 points) Give the factored form of a polynomial whose graph has the same general shape of the one given below.



15. (4 points) Let $p(x)$ be the polynomial whose graph is shown above. Use the graph to solve the inequality $p(x) \geq 0$.

16. (10 points) Find the exact values of the real and complex zeros of $p(x) = x^3 - 4x^2 + 5x$. Show all work.