

Name:

---

Do not begin your test until instructed to do so. You will have 45 minutes to complete the test. The **only** items you are permitted to use are a pencil, eraser, and calculator. Any use of any other item will result in getting a 0 on the test. Keep your eyes on your own test. Getting answers in any form from others will result in getting a 0 on the test. Most of the credit is for showing your work (when appropriate), and the rest for the right answer.  your answers (when appropriate). Talking while any test is out will result in a 10 point penalty.

Good luck! (Even though this is a matter of skill, not luck.)

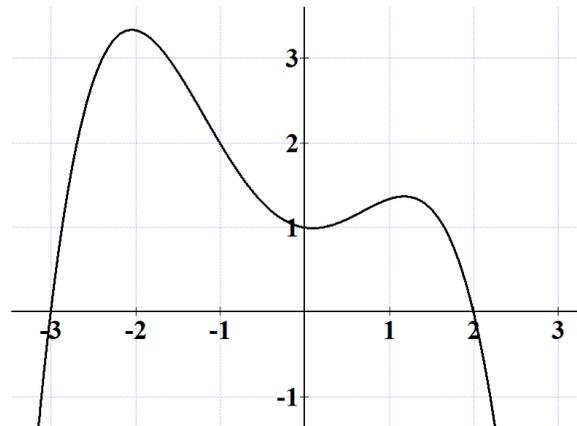
Page	Points	Score
2	32	
3	36	
4	32	
Total:	100	

1. (4 points) Find the domain and range of  $\{(10, 4), (-2, 4), (-1, 1), (5, 6)\}$ . Is the relation a function?

2. (4 points) Does  $x + y^3 = 27$  define  $y$  as a function of  $x$ ?

3. (14 points) Given the graph, find (to the best of your ability) the

- (a) domain.
- (b) range.
- (c)  $x$ -intercept(s).
- (d)  $y$ -intercept(s).
- (e) intervals on which  $f$  is increasing.
- (f) intervals on which  $f$  is decreasing.
- (g) values of  $x$  for which  $f(x) < 0$ .
- (h) values of  $x$  for which  $f(x) > 0$ .
- (i) inputs for which  $f$  has a relative minimum.
- (j) relative minima.
- (k) inputs for which  $f$  has a relative maximum.
- (l) relative maxima.
- (m) values of  $x$  for which  $f(x) = 0$ .
- (n) Is  $f$  even, odd, neither, or both?



4. (5 points) Find the difference quotient of  $f(x) = 2x^2 + x - 1$ .

5. (5 points) Find the difference quotient of  $f(x) = \sqrt{x}$ .

6. (6 points) Sketch  $f(x) = \begin{cases} 4 & \text{if } x \leq -1 \\ 2x - 1 & \text{if } -1 < x < 2 \\ 3 - x & \text{if } x > 2. \end{cases}$

7. (5 points) Find an equation of the line through (-2,-4) and (1,-1).

8. (5 points) Find an equation of the line through (-2,2) and parallel to the line whose equation is  $2x - 3y - 7 = 0$ .

9. (5 points) Find an equation of the line through (-2,2) and perpendicular to the line whose equation is  $2x - 3y - 7 = 0$ .

10. (5 points) Find the average rate of change of  $f(x) = \sqrt{x}$  from  $x_1 = 9$  to  $x_2 = 16$ .

11. Consider  $y = -\sqrt[3]{2x} + 3$ .

(a) (5 points) How can the graph of  $y$  be obtained from the graph of  $f(x) = \sqrt[3]{x}$ ?

(b) (5 points) Sketch  $y$ .

12. (6 points) Given  $f(x) = \frac{5}{x+4}$  and  $g(x) = \frac{1}{x}$  find  $(f \circ g)(x)$  and its domain.

13. (6 points) Find the inverse of  $f(x) = \frac{2x-3}{x+1}$ .

14. (6 points) Find the inverse of  $f(x) = x^2 - 1, x \leq 0$ .

15. The endpoints of the diameter of a circle are (7,11) and (3,9).

(a) (5 points) Find the center of the circle.

(b) (5 points) Find the radius of the circle.

(c) (4 points) Write an equation of the circle.

16. (6 points (bonus)) Given  $f(x) = 2x^2 - 4x + 1, x \geq 2$ , find  $f^{-1}$  and the domain and range of  $f^{-1}$ .