

# Review for Exam # 1

MATH 150  
1.1 through 2.8

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1. Determine the quadrant of  $(x, y)$  if  $(-x, -y)$  is in quadrant II.

# 2-6. Given  $P = (6, 4)$  and  $Q = (-4, 10)$

2. Find the distance  $PQ$ .
3. Find the midpoint of  $PQ$ .
4. Find the slope of  $PQ$ .
5. Find the equation of the perpendicular bisector of  $PQ$ .
6. Find the equation of the circle whose diameter is  $PQ$ .
7. Given:  $x^2 + x + y^2 - 4y - 10 = 0$ ; find the radius and center of the circle.

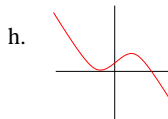
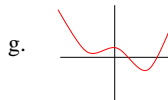
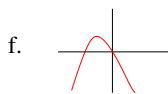
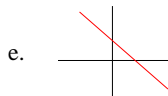
8. Match the equation with its graph:  $a > 0$

a.  $y = ax^4 + bx^3 + c$

b.  $y = -ax^3 + bx + d$

c.  $y = -(x + a)^2 + b$

d.  $y = -ax + e$



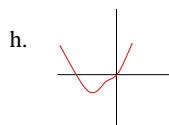
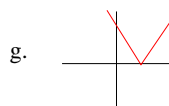
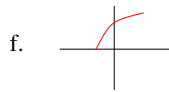
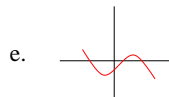
9. Match the equation with its graph:

a.  $y = \sqrt{x + 2}$

b.  $y = x^4 + 2x^3$

c.  $y = -2x^3 + 3x - 1$

d.  $y = |x - 3|$



10. Write the equation of the line passing through  $(2, 9)$  and  $(-4, 5)$ .
11. Write the equation of the parabola whose vertex is  $(2, 9)$  which passes thru  $(-4, 5)$ .
12. Write the equation of the line parallel to  $3x - 5y + 6 = 0$  which passes thru  $(1, 2)$ .
13. Write the equation of the line perpendicular to  $3x - 5y + 6 = 0$  which passes thru  $(1, 2)$ .
14. Find all points equidistant from  $(3, -1)$  and  $(7, -3)$ .
15. Assuming a linear demand curve, if you earned \$22,600 annually in 1986, and \$26,200 in 1990, what would you earn in 1998?

Is this a linear interpolation or linear extrapolation?

16. Solve:  $\frac{1}{x-2} + \frac{3}{x+3} = \frac{4}{x^2+x-6}$

17. Solve:  $\sqrt{x} + \sqrt{x-20} = 10$

18. Solve:  $(x-4)^2 = 9$

19. Solve for r:  $S = \frac{rL - a}{r - 1}$

20. A rancher has 500 ft of fencing for four adjacent corrals. Write a function for the area in terms of  $x$ .

21. Solve:  $5 < 2x + 9 \leq 26$

Write your answer in interval notation.

22. Solve:  $|5 - 2x| \leq 6$

23. Solve:  $|5 - 2x| \geq 6$

24. Solve:  $|5 - 2x| \leq -6$

25. Solve:  $|5 - 2x| \geq -6$

26. Find the domain of each of the following:

a.  $y = \sqrt{4 - x^2}$

b.  $y = \frac{x + 4}{x^2 - 9}$

c.  $xy = 2$

27. Solve:  $\frac{3}{x-1} \leq 2$

Given  $f(x) = 2x^2 - 1$ , and  $g(x) = \sqrt{x-2}$

28. Find the difference quotient for  $f(x)$

29. Find  $(f \circ g)(6)$

30. Find  $f^{-1}(x)$  if the domain of  $f(x)$  is  $x \geq 0$

31.

$$f(x) = \begin{cases} |x^2 - 1|, & \text{if } x < 0 \\ 3x - 4, & \text{if } 0 \leq x \leq 4 \\ x^3, & \text{if } x > 4 \end{cases}$$

Find  $f(1), f(0), f(5), f(-2)$

32. Describe the graph of:  $y = |x - 3| + 1$

33. Describe the graph of:  $y = -2(x + 1)^2$

34. T or F: If  $f$  is an odd function, it's graph is a reflection about the x axis.

35. T or F: If  $f$  is an even function,  $f^{-1}$  exists.

36. T or F: If  $f$  is a rational function, there is no function  $f$  such that  $f(x) = f^{-1}$

37. T or F: If  $f^{-1}$  exist, the y-intercept on  $f^{-1}$  is an x- intercept on  $f$ .

38. Find the inverse of:  $f(x) = \frac{x-2}{x+1}$ , if it exists.

39. Find the vertex of:  $f(x) = \frac{1}{2}x^2 + 4x - 2$

40. Find the vertical asymptotes and holes of:

$$f(x) = \frac{x^2 + 3x - 4}{x^2 - 1}$$

Find the horizontal asymptotes for  $f(x)$

41.  $f(x) = \frac{x+5}{x^2+9x+20}$

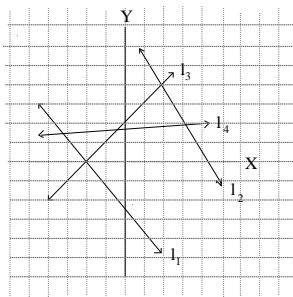
Find the vertical asymptotes and holes of  $f(x)$ .

Find the horizontal asymptotes for  $f(x)$ .

Find the domain.

Find the intercepts.

42. Given the following graph of lines  $l_1, l_2, l_3$ , and  $l_4$ . List these lines in order with increasing slopes.



43. A jogger runs in a race for a total of 6 hrs. He runs at 9mph for  $t$  hrs and the rest of the time at 8 mph. Express the total distance  $d$ , he ran, as a function of  $t$ .

44. Given:  $f(x) = x^2 - 1$ ,  $g(x) = \frac{x-1}{x+2}$ , and

$$h(x) = \sqrt{x}$$

a) find  $f(3)$

b) find  $f(x+1)$

c) find  $(f \circ g)(3)$

d) find  $(f \circ g \circ h)(4)$

e) find  $(g \circ f)(3)$

f) find  $g\left(\frac{1}{x-2}\right)$

45. Change  $\sqrt{24}$  into rational form.

46. Simplify:  $1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{x}}}$

47. T or F: Non-negative means positive.

48. T or F:  $1.\bar{9} = 2$

49. T or F: All straight lines with equal slopes are parallel.

50. T or F: All parallel lines have equal slopes.

51. The concentration of gold in the locket is 5%. How much silver should they add to change the concentration of gold to 4%, if the locket originally weighed 24 ounces?

52. Given: P varies jointly with Q and R and inversely with the square of the distance from the source of the heat. If  $P = 6$  when  $Q = 8, R = 9$ , and the distance is 6ft, write an equation which describes this relationship.

53. If Jose and Ross can clean their room together in 2hrs, and Jose can do the job by himself in 3 hrs, how long will it take Ross to do the job alone?

54. Solve by completing the square:  $4x^2 - 24x + 7 = 0$

55. Factor:  $x^4 + 6x^2 + 25$

56. Solve:  $x^{4/5} - x^{2/5} - 6 = 0$

57. Solve:  $\frac{x+1}{x-2} \leq 3$

58. The table shows the number of CD players sold in a small store from 1990 to 2000. What was the average rate of change of sales from 1992 to 1998?

Year	# CD players
1990	582
1992	612
1994	660
1996	680
1998	742
2000	834

59. Describe the graph of  $y = \beta(x - \alpha)^2 + \gamma$

60. Find the parabola whose vertex is  $(5, -2)$  which passes through  $(-4, 1)$ .

61. Find the inverse of  $f(x) = \frac{x-2}{x+5}$

62. Luke's Pizza Lounge offers a plain pizza for \$5, and \$1.5 for each additional topping. Thus if you order a pizza with  $x$  toppings, the price of your pizza is given by the function:

$$f(x) = 1.5x + 5$$

Find  $f^{-1}$

What does the inverse function represent?

**Answers:**

1. IV

2.  $2\sqrt{34}$

3.  $(1, 7)$

4.  $\frac{-3}{5}$

5.  $5x - 3y + 16 = 0$

6.  $x^2 + y^2 - 2x - 14y + 16 = 0$

7.  $(\frac{-1}{2}, 2), r = \frac{\sqrt{57}}{2}$

8.  $a \Rightarrow g, b \Rightarrow h, c \Rightarrow f, d \Rightarrow e$

9.  $a \Rightarrow f, b \Rightarrow h, c \Rightarrow e, d \Rightarrow g$

10.  $y = \frac{2}{3}x + \frac{23}{3}$

11.  $y = \frac{-1}{9}(x - 2)^2 + 9$

12.  $y = \frac{3}{5}x + \frac{7}{5}$

13.  $y = \frac{-5}{3}x + \frac{11}{3}$

14.  $y = 2x - 12$

15. \$33,400, extrapolation

16.  $x = \frac{7}{4}$

17.  $x = 36$

18.  $x = 7, 1$

19.  $r = \frac{S - a}{S - L}$

20.  $A = \frac{-32}{5}x^2 + 400x$

21.  $(-2, \frac{17}{2}]$

22.  $[\frac{-1}{2}, \frac{11}{2}]$

23.  $(-\infty, \frac{-1}{2}] \cup [\frac{11}{2}, \infty)$

24. no solution

25.  $\mathfrak{R}$

26a.  $[-2, 2]$ , b.  $\mathfrak{R}, x \neq 3, -3$ , c.  $\mathfrak{R}, x \neq 0$

27.  $(-\infty, 1) \cup [\frac{5}{2}, \infty)$

28.  $4x + 2h$

29. 7

30.  $y = \frac{\sqrt{2x+2}}{2}$

31.  $f(1) = -1, f(0) = -4, f(5) = 125, f(-2) = 3$

32. rigid transformation of the graph of  $y = |x|$  shifted right 3 and up 1.

33. parabola, basic shape of  $y = x^2$  stretched by a factor of 2; shifted left 1, reflected about the x-axis

34. false

35. false

36. false

37. true

38.  $f^{-1} = \frac{x+2}{1-x}$

39.  $(-4, -10)$

40. va:  $x = -1$ ; hole:  $x = 1$ ; ha:  $y = 1$

41. va:  $x = -4$ ; hole:  $x = -5$ ; ha:  $y = 0$ ; domain:  $\mathfrak{R}, x \neq -5, -4$ ; intercepts:  $(0, \frac{1}{4})$

42.  $l_2, l_1, l_4, l_3$

43.  $d = t + 48$

44. a) 8; b)  $x^2 + 2x$ ; c)  $\frac{-21}{25}$ ; d)  $\frac{-15}{16}$ ; e)  $\frac{7}{10}$ ;

f)  $\frac{3-x}{2x-3}$

45.  $\frac{8}{33}$

46.  $x$

47. false

48. true

49. true

50. false

51. 6 sources

$$52. P = \frac{3QR}{d^2}$$

53. 6 hrs.

$$54. x = 3 \pm \frac{\sqrt{29}}{2}$$

$$55. (x^2 + 2x + 5)(x^2 - 2x + 5)$$

$$56. x = \pm 9\sqrt{3}$$

$$57. (-\infty, 2) \cup [\frac{7}{2}, \infty)$$

58.  $21.\overline{6}$

59. basic shape of  $y = x^2$  stretched by a factor of  $\beta$ ,  
shifted right  $\alpha$  and up  $\gamma$

$$60. y = \frac{3}{81}(x - 5)^2 - 2$$

$$61. f^{-1} = \frac{5x + 2}{1 - x}$$

62.  $f^{-1} = \frac{2}{3}x - \frac{10}{3}$ ;  $f^{-1}$  represents number of top-pings