

THE HOUSTON COMMUNITY COLLEGE - SOUTHWEST

MATH 1314 FINAL REVIEW PROBLEMS

11-08-11

These exercises represent a compilation of typical problems in this course. This is NOT a sample of the final exam. However, doing these problems will help you prepare for the final exam

1. Solve the equation $(9x + 5)^2 = 2$.

2. Solve the equation

$$3x^2 + 6x = -4$$

3. Use algebraic tests to check the following for symmetry with respect to the axes and the origin.

$$y = 5x^5 - x^3 + 1$$

4. Write the standard form of the equation of the circle with the given characteristics.
endpoints of a diameter: $(-1, 4)$, and $(7, 6)$

5. Solve the inequality.

$$9x^2 + 24x > -16$$

6. Solve the inequality.

$$\frac{x-1}{x+5} \geq 0$$

7. Solve the inequality. Express the solution set in interval notation.

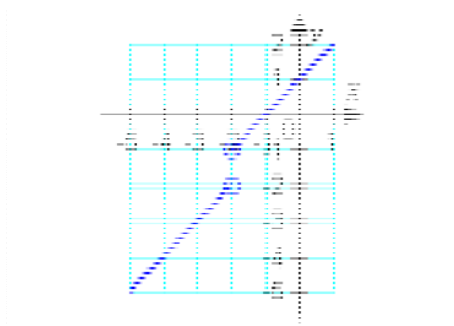
$$|2x - 1| - 9 > 2$$

8. Write the slope-intercept form of the equation of the line through the given point perpendicular to the given line.

point: $(-8, 8)$

line: $-5x - 15y = 5$

9. Use the graph of the function to find the domain and range of f .



10. Find all solutions to the following equation.

$$x - \sqrt{2x - 4} = 2$$

11. Find the domain of the function.

$$y = \sqrt{1 - 2x}$$

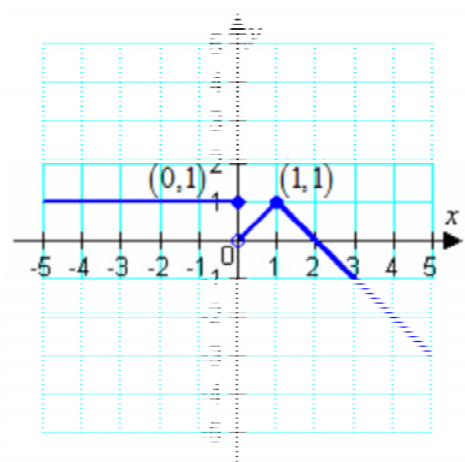
12. Evaluate the function at the specified value of the independent variable and simplify.

$$f(t) = \begin{cases} t, & t \leq -1 \\ t^2 - 3t, & -1 \leq t \leq 1 \\ t^3 - 3t^2, & t > 1 \end{cases}$$

$$f\left(\frac{1}{3}\right)$$

13. Determine the intervals over which the function is increasing, decreasing, or constant.

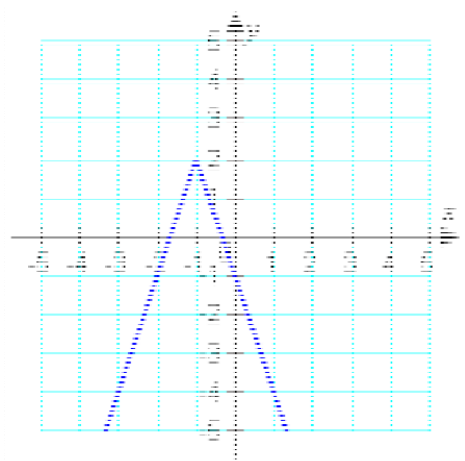
$$f(x) = \begin{cases} 1, & x < 1 \\ -|x - 1| + 1, & x \geq 1 \end{cases}$$



14. Use the graph of

$$f(x) = |x|$$

to write an equation for the function whose graph is shown.



15. Evaluate the indicated function for $f(x) = x^2 + 9$ and $g(x) = x - 7$.

$$(f - g)(t - 9)$$

16. Evaluate the indicated function for $f(x) = x^2 - 7$ and $g(x) = x - 8$.

$$(fg)(-1)$$

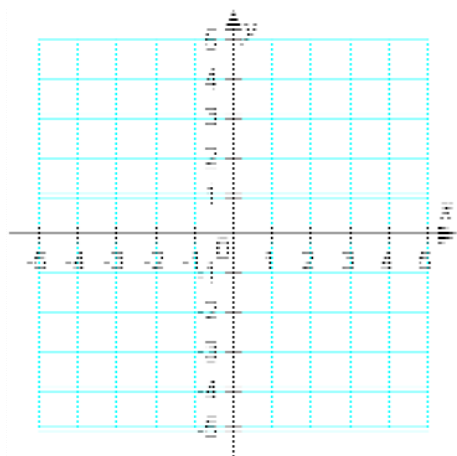
17. Find $g \circ f$.

$$f(x) = x - 1 \quad g(x) = x^2 + x$$

18. Describe the right-hand and the left-hand behavior of the graph of $n(x) = -\frac{8}{11}(x^3 - 4x^2 + x + 1)$.

19. Graph the given function.

$$f(x) = (x - 2)^2 - 1$$



20. Find the inverse function of f .

$$f(x) = \frac{3x - 4}{4x - 7}, x \neq \frac{7}{4}$$

21. Determine whether the function has an inverse function. If it does, find the inverse function.

$$f(x) = (x - 4)^3 + 6$$

22. From the graph of the quadratic function $f(x) = -3x^2 + 6x + 6$, determine the equation of the axis of symmetry.

23. Write the quadratic function $f(x) = -x^2 + 16x - 61$ in standard form.

24. Identify the center and radius of the circle.

$$(x + 5)^2 + (y + 4)^2 = 64$$

25. Find all real zeros of the polynomial $f(x) = x^4 + 10x^3 + 9x^2$ and determine the multiplicity of each.

26. Use synthetic division to divide.

$$\left(x^3 - 75x + 250 \right) \div (x - 5)$$

27. Given that one of the factors is $(x + 3)$ find the remaining factor(s) of $f(x) = x^3 + 9x^2 + 26x + 24$ and write the polynomial in fully factored form.

28. Write all possible rational zeros of the function $f(x) = -2x^4 + 4x^3 + 79x^2 - 100x + 10$., as per rational zeros theorem.

29. Determine all zeros of $f(x) = x^3 - 3x^2 - 16x + 48$.

30. Determine the equations of any horizontal and vertical asymptotes of $f(x) = \frac{x^2 - 4}{x^2 + x - 6}$.

31. Find the vertical and horizontal asymptotes of $f(x) = \frac{x - 9}{x^2 - 81}$.

32. Find the domain of $f(x) = \frac{x^2 - 36}{x^2 + x - 42}$.

33. Find the exact value of $\log_7 \sqrt[3]{49}$ without using a calculator.

34. Rewrite the logarithm $\log_3 142$ in terms of the common logarithm .

35. Use properties of logarithm to expand the expression as a sum, difference, and/ or constant multiple of logarithms

$$\log \frac{(x-1)^3}{y^2 z}$$

36. Condense the expression $7(\log x - \log y) + 2 \log z$ to the logarithm of a single term.

37. Solve the system

$$\begin{cases} x - y = -1 \\ x^2 - y = 5 \end{cases}$$

38. Solve the system $\begin{cases} \frac{7}{9}x + \frac{1}{9}y = \frac{8}{9} \\ 7x + y = 8 \end{cases}$

39. Solve using any method.

$$\begin{cases} 2x + 9y = -9 \\ 9x - 8y = -19 \end{cases}$$

40. Rewrite the exponential equation $5^{-3} = \frac{1}{125}$ in logarithmic form.

41. Solve the equation..

$$2e^{x+3} = 5$$

42. Solve the equation.

$$\log x + \log(x - 3) = 1$$

43. Solve for X in the equation given.

$$-2X = 4A - B, A = \begin{bmatrix} -2 & -3 \\ -1 & -8 \end{bmatrix} \text{ and } B = \begin{bmatrix} -2 & -16 \\ 6 & -42 \end{bmatrix}$$

44. Find the determinant of the matrix $\begin{bmatrix} \frac{5}{3} & -\frac{4}{3} \\ -5 & -\frac{1}{3} \end{bmatrix}$.

45. If possible, find AB .

$$A = \begin{bmatrix} 8 & -4 \\ -6 & 1 \\ 6 & 2 \end{bmatrix}, B = \begin{bmatrix} -4 \\ -3 \end{bmatrix}$$

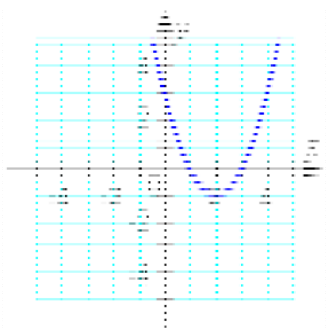
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Answer Section

SHORT ANSWER

1. $x = \frac{-5 + \sqrt{2}}{9}, \frac{-5 - \sqrt{2}}{9}$
2. $x = \frac{-3 + \sqrt{3}i}{3}, \frac{-3 - \sqrt{3}i}{3}$
3. no symmetry
4. $(x - 3)^2 + (y - 5)^2 = 17$
5. $\left(-\infty, -\frac{4}{3}\right) \cup \left(-\frac{4}{3}, \infty\right)$
6. $(-\infty, -5) \cup [1, \infty)$
7. $(-\infty, -5) \cup (6, \infty)$
8. $y = 3x + 32$
9. domain: $(-\infty, -2) \cup (-2, \infty)$
range: $(-\infty, -2) \cup (-1, \infty)$
10. $x = 4, x = 2$
11. $(-\infty, \frac{1}{2}]$
12. $-\frac{8}{9}$
13. constant on $(-\infty, 0)$
increasing on $(0, 1)$
decreasing on $(1, \infty)$
14. $f(x) = -3|x + 1| + 2$
15. $t^2 - 19t + 106$
16. 54
17. $(g \circ f)(x) = x^2 - x$
18. Because the degree is odd and the leading coefficient is negative, the graph rises to the left and falls to the right.

19.



$$20. f^{-1}(x) = \frac{7x-4}{4x-3}, x \neq \frac{3}{4}$$

$$21. f^{-1}(x) = \sqrt[3]{x-6} + 4$$

$$22. x = 1$$

$$23. f(x) = -(x-8)^2 + 3$$

$$24. \text{center: } (-5, -4) \quad \text{radius: } 8$$

$$25. x = 0, \text{ multiplicity } 2; x = -9, \text{ multiplicity } 1; x = -1, \text{ multiplicity } 1$$

$$26. x^2 + 5x - 50$$

$$27. f(x) = (x+3)(x+4)(x+2)$$

$$28. x = 1, -1, 2, -2, 5, -5, 10, -10, \frac{1}{2}, -\frac{1}{2}, \frac{5}{2}, -\frac{5}{2}$$

$$29. x=3, 4, -4$$

$$30. \text{horizontal: } y = 1; \text{vertical: } x = -3$$

$$31. \text{Vertical asymptote } x = -9, \text{Horizontal asymptote : } y = 0$$

$$32. \text{all real numbers except } x = 6 \text{ and } x = -7$$

$$33. \frac{2}{3}$$

$$34. \frac{\log 142}{\log 3}$$

$$35. 3 \log(x-1) - 2 \log y - \log z$$

$$36. \log\left(\frac{x}{y}\right)^7 z^2$$

$$37. (-2, -1), (3, 4)$$

$$38. (a, 8-7a) \text{ (dependent)}$$

$$39. \left(-\frac{243}{97}, -\frac{43}{97}\right)$$

$$40. \log_5 \frac{1}{125} = -3$$

$$41. x = \ln\left(\frac{5}{2}\right) - 3$$

$$42. x = 5$$

$$43. \begin{bmatrix} 3 & -2 \\ 5 & -5 \end{bmatrix}$$

$$44. -\frac{65}{9}$$

$$45. \begin{bmatrix} -20 \\ 21 \\ -30 \end{bmatrix}$$