MATH 1314 MyLab Math Final Exam Study Sheet

Learning and practice has occured using the student resources and graded assignments in this course. When studying math you should not study in order, practice using the eText and MLM HW assignments. If you can work the questions without your notes correctly then you are ready for an exam, otherwise seek help and ask questions. MLM exams have 12 to 20 questions.

**NOTE: This study sheet may reflect some exam questions, however, this study sheet may not reflet every type of question that may be included on the exam.*

Use Descartes' Rule of Signs to determine the possible number of positive real zeros and the possible number of negative real zeros for the function.

1. $P(x) = -4x^4 - 8x^3 - 7x^2 - 9x + 8$

State the domain of the rational function.

2. $f(x) = \dfrac{7x - 8}{9x + 36}$

Graph the function using its vertex, axis of symmetry, and intercepts.

3. $f(x) = -4x^2 + 8x - 7$

Given that the polynomial function has the given zero, find the other zeros.

4. $f(x) = x^3 - 5x^2 + 11x - 15;\ 3$

Graph the piecewise function.

5. $f(x) = \begin{cases} -x + 5, & \text{for } x < -2, \\ 9, & \text{for } -2 \le x < 0, \\ x^2 - 5, & \text{for } x \ge 0 \end{cases}$

For the function find the maximum number of real zeros that the function can have, the maximum number of x–intercepts that the function can have, and the maximum number of turning points that the graph of the function can have.

6. $g(x) = -x^5 - 7x^3 - 6x + 3$

Find the requested function value.

7. Find $(g \circ f)(5)$ when $f(x) = -9x + 8$ and $g(x) = 5x^2 + 4x + 4$.

Given the polynomial function f(x), find the rational zeros, then the other zeros (that is, solve the equation f(x) = 0), and factor f(x) into linear factors.

8. $f(x) = x^3 - 12x - 16$

Convert to an exponential equation.

9. $\log_7 343 = 3$

Find the requested polynomial.

10. Find a polynomial of degree 3 having the following zeros:
    $1 + \sqrt{3}$, $1 - \sqrt{3}$, and 7

Find the requested value.

11. Using the given tables, find $(g \circ f)(8)$

x	8	11	9	18
f(x)	9	16	43	45

x	10	18	8	9
g(x)	19	15	18	17

Find the correct end behavior diagram for the given polynomial function.

12. $f(x) = -x^5 - 5x^3 - 7x + 4$

13. $f(x) = -x^6 + 3x^5 - x^2 - 6x + 7$

Find the vertical asymptote(s) of the graph of the given function.

14. $f(x) = \dfrac{x^2 + 3x}{x^2 - 3x - 18}$

Use synthetic division to find the function value.

15. $f(x) = 3x^5 - 4x^4 + 2x^3 - x + 2$; find f(3).

Find the zeros of the polynomial function and state the multiplicity of each.

16. $f(x) = -5x^2(x - 6)(x + 1)^3$

Use Gaussian elimination or Gauss–Jordan elimination to solve the problem.

17. Ellen wishes to mix candy worth \$1.85 per pound with candy worth \$5.72 per pound to form 24 pounds of a mixture worth \$4.75 per pound. How many pounds of the more expensive candy should she use?

Convert to a logarithmic equation.

18. $e^{-4} = t$

Graph the function.

19. $f(x) = x^4 - 5x^3 + 4x^2$

Solve the system of equations using Gaussian elimination or Gauss–Jordan elimination.

20. $x + y + z = 5$
    $x - y + 5z = 25$
    $4x + y + z = 14$

21. $3x - 7y = 13$
    $6x - 14y = 11$

Solve the problem.

22. The quadratic function $f(x) = 0.0037x^2 - 0.44x + 36.08$ models the median, or average, age, y, at which U.S. men were first married x years after 1900. In which year was this average age at a minimum? (Round to the nearest year.) What was the average age at first marriage for that year? (Round to the nearest tenth.)

23. $A(x) = -0.015x^3 + 1.05x$ gives the alcohol level in an average person's bloodstream x hours after drinking 8 oz of 100–proof whiskey. If the level exceeds 1.5 units, a person is legally drunk. Would a person be drunk after 5 hours?

24. John owns a hot dog stand. He has found that his profit is represented by the equation $P(x) = -x^2 + 58x + 69$, with P being profits and x the number of hot dogs sold. How many hot dogs must he sell to earn the most profit?

25. Suppose that a polynomial function of degree 4 with rational coefficients has $-3 + 5i$, $5 - \sqrt{3}$ as zeros. Find the other zeros.

26. John owns a hotdog stand. His profit is represented by the equation $P(x) = -x^2 + 14x + 59$, with P being profits and x the number of hotdogs sold. What is the most he can earn?

27. The number of reports of a certain virus has increased exponentially since 1960. The current number of cases can be approximated using the function $r(t) = 475\, e^{0.002t}$, where t is the number of years since 1960. Estimate the of cases in the year 2000.

28. Given that $\log_a 2 = 0.3010$ and $\log_a 3 = 0.4771$, find $\log_a 54$.

29. Let $\log_b A = 3.584$ and $\log_b B = 0.30$. Find $\log_b \frac{A}{B}$.

30. $e^{-0.16t} = 0.25$

31. $\log (x - 3) = 1 - \log x$

32. Under ideal conditions, a population of rabbits has an exponential growth rate of 11.7% per day. Consider an initial population of 200 rabbits. Find the exponential growth function.

Find the horizontal asymptote, if any, of the rational function.

33. $f(x) = \dfrac{8x^2 + 2}{x^2 - 2}$

34. $f(x) = \dfrac{x + 6}{2x^2 + 7x - 3}$

Find a polynomial function of lowest degree with rational coefficients that has the given numbers as some of its zeros.

35. $-3i, 2$

Factor the polynomial f(x). Then solve the equation f(x) = 0.

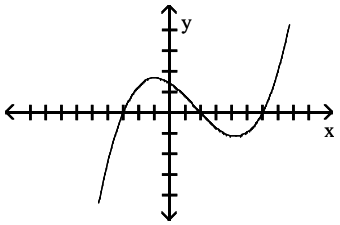
36. $f(x) = x^3 + 2x^2 - 23x - 60$

Give all possible rational zeros for the polynomial.

37. $f(x) = 2x^3 + 6x^2 + 10x - 8$

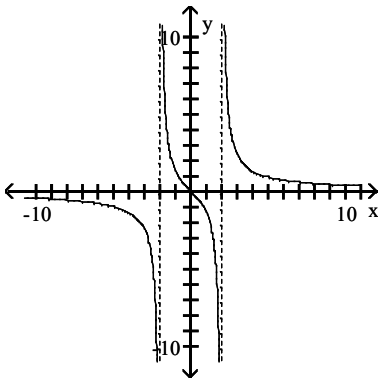
Solve the given inequality (a related function is graphed).

38. $x^3 - 5x^2 \le 12x - 36$



x–intercepts: (–3, 0), (2, 0), (6, 0)

39. $\dfrac{4x}{x^2 - 4} \ge 0$



40. $\dfrac{(x + 10)(x - 4)}{x - 1} \ge 0$

41. $x^3 + 4x^2 - 4x - 16 \ge 0$

42. $\dfrac{(x - 1)(3 - x)}{(x - 2)^2} \le 0$

Using synthetic division, determine whether the numbers are zeros of the polynomial.

43. $1, -\dfrac{1}{2}; f(x) = x^3 - 3x^2 - \dfrac{1}{4}x + \dfrac{3}{4}$

Graph the polynomial function. Use synthetic division and the remainder theorem to find the zeros.

44. $f(x) = 3x^3 + 5x^2 - 16x - 12$

Determine the order of the matrix.

45. $\begin{bmatrix} 1 & -7 \\ 5 & 0 \\ -5 & 8 \\ 7 & -1 \end{bmatrix}$

For the given functions f and g , find the indicated composition.

46. $f(x) = \sqrt{x + 7}, \quad g(x) = 8x - 11$

$(f \circ g)(x)$

Determine whether the given function is one–to–one. If it is one–to–one, find a formula for the inverse.

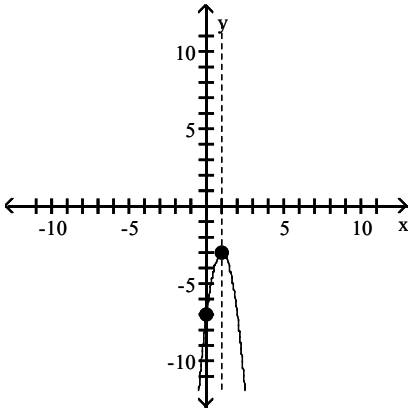
47. $f(x) = \dfrac{6}{x - 9}$

For the given functions f and g , find the indicated composition.

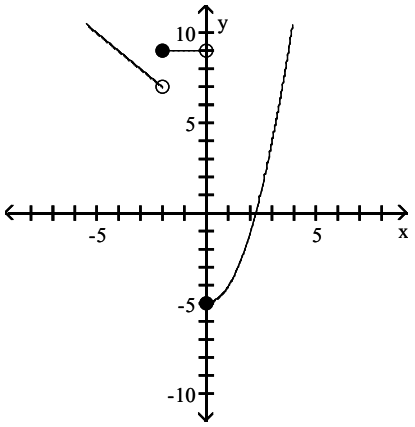
48. $f(x) = 4x^2 + 4x + 7, \quad g(x) = 4x - 5$

$(g \circ f)(x)$

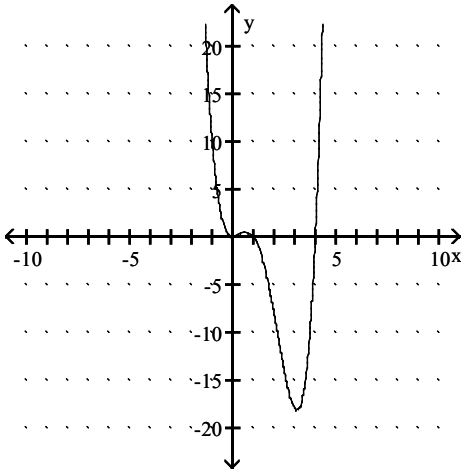
1. 1 positive; 1 or 3 negative
2. $(-\infty, -4) \cup (-4, \infty)$
3. vertex (1, –3)
   intercept (0, –7)



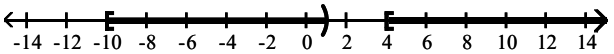
4. 1 + 2i, 1 – 2i
5.



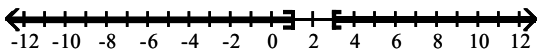
6. 5; 5; 4
7. 6701
8. –2, multiplicity 2; 4; $f(x) = (x + 2)^2(x - 4)$
9. $7^3 = 343$
10. $f(x) = x^3 - 9x^2 + 12x + 14$
11. 17
12.
13.
14. x = 6
15. 458
16. –1, multiplicity 3; 0, multiplicity 2; 6, multiplicity 1
17. 18 lb
18. ln t = –4
19.



20. (3, –2, 4)
21. No solution
22. 1959, 23 years old
23. Yes
24. 29 hot dogs
25. $-3 - 5i$, $5 + \sqrt{3}$
26. $108
27. 515 cases
28. 1.7323
29. 3.284
30. 8.664
31. 5
32. $P(t) = 200e^{0.117t}$
33. y = 8
34. y = 0
35. $f(x) = x^3 - 2x^2 + 9x - 18$
36. (x + 3)(x + 4)(x – 5) ; –3, –4, 5
37. $\pm 1, \pm \frac{1}{2}, \pm 2, \pm 4, \pm 8$
38. $(-\infty, -3] \cup [2, 6]$
39. $(-2, 0] \cup (2, \infty)$
40. $[-10, 1) \cup [4, \infty)$

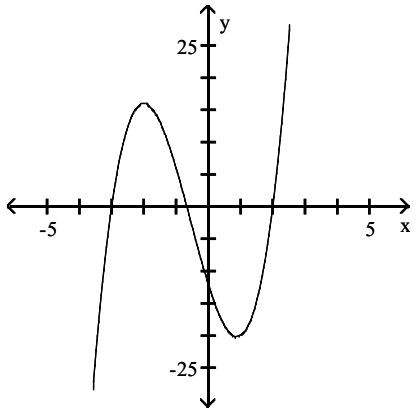


41. $[-4, -2] \cup [2, \infty)$
42. $(-\infty, 1] \cup [3, \infty)$



43. No; yes

44. $2, -\frac{2}{3}, -3;$



45. 4×2

46. $2\sqrt{2x - 1}$

47. $f^{-1}(x) = \frac{9x + 6}{x}$

48. $16x^2 + 16x + 23$