

Math Analysis I Honors- Midyear Review -

Scientific Calculators Only! - Show all work!

1. Find the slope of the line $2x - 3y + 7 = 9$.
2. Find the slope of the line $5y + 12x = 4$.
3. Find the equation of the line parallel to $5x + 10y = 3$ with a y-intercept of 2.
4. Find the equation of the line perpendicular to $5x + 10y = 3$ with a y-intercept of -1.
5. Find the value of A in the equation $3x + Ay = 10$ if the point (1,2) lies on the line.
6. Find the value of A in the equation $y = 2Ax^2 + 10$ if the point (1,16) lies on the parabola.
7. Find the point of intersection between the lines $x - 3y = 9$ and $2x + 2y = -6$.
8. Find the point of intersection between the line $y = 2x + 5$ and the parabola $y = 8 - x^2$.
9. Find the vertex of the parabola $y = 2x^2 + 4x - 10$.
10. Find the vertex of the parabola $y = x^2 - 10x + 1$.
11. Find the equation of the line through the points (1,3) and (-1,7).
12. Find the equation of the line through the points (2,-3) and (4,3).
13. The imaginary number i^{20} is equal to:
14. The imaginary number i^{33} is equal to:
15. Simplify $\sqrt{-32}$
16. Simplify $\sqrt{-50}$
17. Find the product of the complex numbers $(2 + 3i)$ and $(4 - i)$.
18. Find the product of the complex numbers $(5 - 2i)$ and $(-2 + 3i)$.
19. Solve for x: $x^2 + 3x = 10$.
20. Solve for x: $2x^2 + 4x - 12 = 0$.
21. Find the minimum value of the parabola $f(x) = x^2 - 4x - 8 = 0$.
22. Find the maximum value of the parabola $f(x) = -x^2 + 3x - 18$.
23. At what points does $f(x) = x^2 - 8x + 15$ intersect the x-axis?
24. At what points does $f(x) = x^2 + 4x - 12$ intersect the x-axis?
25. Sketch a graph of the equation $f(x) = x(x + 2)(x - 1)$.
26. Sketch a graph of the equation $f(x) = (x + 1)^2(x - 4)(x - 2)$.
27. Find the remainder when $2x^3 + 5x^2 + 4x + 1$ is divided by $x - 3$.
28. Find the remainder when $3x^4 - 3x^3 + 6x + 2$ is divided by $x + 2$.
29. Find a cubic equation with roots of 0, 2 and -3.
30. Find a quartic equation with roots of 2 and 4, and a double root at -1.
31. Why must a function with an odd degree have at least one x-intercept?
32. What is true about all irrational and imaginary (complex) roots?
33. How many x-intercepts can a quartic equation have?
34. What does a point where a polynomial's graph is tangent to the x-axis represent?
35. If $f(x) = 3x^2 + kx - 5$ and $f(3) = 8$, what is the value of k?
36. If $f(x) = x^3 + x^2 + 4x - 2k$ and $f(2) = 18$, what is the value of k?
37. Solve the inequality $4x - 16 > -7$.
38. Solve the inequality $-2x + 5 \geq 12$.

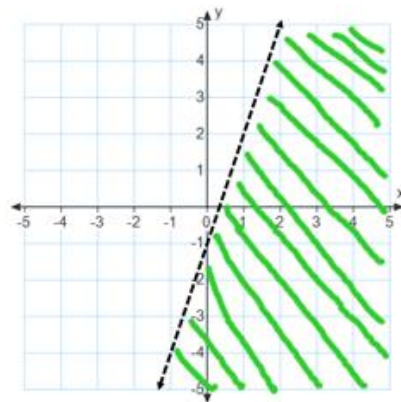
39. Find the solution set to the inequality $|2x + 5| < 6$.
40. Find the solution set to the inequality $|x - 4| \geq 10$.
41. Solve the following polynomial inequality: $(x - 1)^2(x + 2) > 0$.
42. Solve the following polynomial inequality: $(x + 2)(x - 3)(x - 5) < 0$.
43. Graph the solution to $2y - 3x > 12$.
44. Graph the solution to $3y + 6x < 10$.
45. Find the domain and range of the function $f(x) = |x| - 3$.
46. Find the domain and range of the function $f(x) = \pm\sqrt{x + 10}$.
47. If $f(x) = 4x - 5$, find f^{-1} .
48. If $f(x) = x^3 + 4$, find f^{-1} .

For #49 – 56, use $f(x) = x^2 - 3x$ and $g(x) = 4x - 5$.

49. Find $h(3)$ if $h(x) = [f(x)][g(x)]$.
50. Find $h(x) = (f + g)(x)$.
51. Find $f(g(3))$.
52. Find $g(f(-1))$.
53. Find $(f \circ g)(x)$.
54. Find $(g \circ f)(x)$.
55. Using $f(x)$ above, sketch the graph of $f(-x)$.
56. Using $f(x)$ above, sketch the graph of $|f(x)|$.
57. How does the graph of $y = |x - 2| - 1$ compare to the graph of $y = |x|$?
58. How does the graph of $y = x^2 + 3$ compare to the graph of $y = x^2$?
59. Graph the piecewise function $f(x) = \begin{cases} x^2 & \text{if } x \leq -2 \\ x - 3 & \text{if } x > -2 \end{cases}$. Find $f(2)$ and $f(-5)$.
60. Graph the following piece-wise function by hand. Then identify its domain, range, and zeros.

$$f(x) = \begin{cases} -x + 2, & 1 \leq x < 4 \\ x^2, & -2 \leq x < 1 \end{cases}$$

61. What is the domain of $\frac{3}{x+4}$?
62. What is the domain of $x^2 + 3x - 4$?
63. Solve for x : $50 = 2(x-5)^2$
64. Simplify $\frac{6}{3+i}$
65. Write an inequality for the following graph →
66. What types of functions have inverse functions?
67. If $f(x) = 2\llbracket x \rrbracket - 3$, find $f(\frac{1}{2})$, $f(\pi)$, and $f(-3.2)$
68. How is the amplitude and fundamental period of a function found?
69. Simplify. Eliminate negative exponents.



a) $(-3x^3)^2 \cdot 3x^{-8}$

b) $xz^{-3}(xz^3 - 4z^4)$

c) $\frac{6x^{1/2}y^{-1/2} - 4x^2y^{1/2}}{8xy^{-3/2}}$

70. Change to exponential form and solve:

a) $\log_2 64 = x$

b) $\log_x 32 = 5$

c) $\log_{81} x = 1/2$

d) $\ln e^3 = x$

e) $\log 1000 = x$