

Park Ridge High School
Summer Assignment 2026-2027
Precalculus Honors
Mr. Kopelman

The problems in this packet are designed to help you review topics from previous Mathematics courses that are important to your success in Precalculus Honors. It is expected that you will complete all the problems without a calculator, except for #s 15, 50, 57, & 58. Show all of your work for full credit. If you need additional space, please attach your papers to the packet. Your work must be in **PENCIL**, legible, and organized.

Due in class on Friday, September 4th.

1. Simplify: $(3x^2 - 2x + 5) + (x - 3 + 4x^2) =$
2. Factor completely: $x^2 - 5x - 6$
3. Solve for x : $\frac{2x+1}{3} = x - 4$
4. Solve the inequality: $2x + 7 > 3x - 1$
5. Solve: $|3x-2| = 10$
6. Factor: $64 + x^3$
7. $(2x^2)^3 * (x^{-1}) =$
8. Rewrite the equation $y = 2x + 4$ in point-slope form. (Pick a coordinate pair).
9. Solve using the quadratic formula: $2x^2 - 4x - 3 = 0$.
10. Find the domain & range for $y = \frac{2}{x-4}$.
11. Solve the system:
 $3x + 5y = -1$
 $y + 8x = 22$
12. Solve the system:
 $x + y + z = 6$
 $2x - y + z = 4$
 $x + 2y - z = 3$
13. Solve for x :
 $\sqrt{x + 5} = x - 1$
14. $(x^2 + x - 2) / (x - 1) =$

15. Solve for x : $\log x + \log 2 = 3$
16. Find the distance between the points $(3, 6)$ and $(7, -1)$.
17. Find the midpoint of the segment with the endpoints from #16.
18. Find the equation of the line passing through $(1, 2)$ with a slope of -3 .
19. Determine if the triangle with vertices $(0,0)$, $(4,0)$, & $(4,3)$ is a right triangle.
20. Find the equation of the circle with a center at $(-2, 4)$ and a diameter of 10 .
21. Find the measure of the angle formed by two intersecting lines with slopes of -1 & 1 .
22. Divide using long division: $(2x^3+3x^2-4x+1) / (x+2)$.
23. Divide using synthetic division: $(x^3+2x^2-x-2) / (x+1)$.
24. Factor completely: $(x^3 - x^2 - x + 1)$.
25. Find all real zeroes of $x^3 - 6x^2 + 11x - 6$.
26. Multiply: $(x - 3)(x^2 + 2x + 5)$.
27. Determine if $x + 2$ is a factor of $x^3 + 5x^2 + 6x$.

28. Describe the ending behavior of $f(x) = -x^3 - 2x^4 + 5x - 8$.
29. Complete the square: $x^2 - 8x + 12$. Rewrite in vertex form.
30. Find the axis of symmetry and vertex of $f(x) = 2x^2 - 4x + 1$.
31. Use the discriminant to determine the # and type of roots for $x^2 - 3x - 5 = 0$
32. Simplify $(2x-3y)^2$
33. Identify the translations in $y = -2(x+3)^2 - 1$.
34. Find the maximum height and length of flight for a soccer ball following the path $y = -x^2 + 6x$.
35. Solve the quadratic inequality $x^2 - 4 < 0$.
36. Convert to standard form $(x-3)^2 - 5$.
37. Identify where $y = -x^3 + 3x$ is increasing and decreasing.
38. Is the function in #37 odd, even, or neither?
39. Find all solutions of $f(x) = 4x^3 - 4x^2 - x + 1$.
40. Complete the square and write $y = 2x^2 - 8x + 12 = 0$ in vertex form.

41. Find the domain & range for $y = -\sqrt{5-x}$

42. Find ALL solutions of $y = x^3 - 2x^2 + x - 2$.

43. Find ALL asymptotes of $\frac{3x^2+1}{x^2-4}$.

44. Simplify and graph $f(x) = \frac{x^2-9}{x^2-x-6}$.

45. Apply the Remainder Theorem to evaluate $f(x) = x^3 + x^2 - 2x + 5$ at $x = 2$.

46. Simplify $\sqrt{4800}$.

47. Solve $\sqrt{2x+3} - 1 = 2$

48. Simplify $(\sqrt{2} + 1)^2$.

49. Simplify $(-4x^6)^3$

50. Exponential Growth: If $A = 100(1.03)^t$, find A when $t = 4$ days.

51. Find the roots of $y = x^3 + 5x^2 + 6x$.

52. Find the inverse of $f(x) = 2x + 7$.

53. Given $f(x) = x^2$, and $g(x) = x + 1$, find $f(g(-4))$.

54. Sketch the graph of $f(x) = -|2x+4|$.

55. Find the average rate of change of $f(x) = x^2 + 3x$ from $x = 1$ to $x = 4$.

56. Solve $\frac{3x-2}{x+1} = 2$.

57. Solve $e^x = 6$

58. Solve $\ln x = 5$.

59. Solve $x^{\frac{2}{3}} = 64$.

60. Evaluate $81^{\frac{3}{4}}$.

61. Convert 300° to radians.

62. Convert -135° to radians.

63. Convert $\frac{5\pi}{6}$ to degrees.

64. Convert $\frac{-9\pi}{2}$ to degrees.

65. Find the $\sin(60^\circ)$.

66. Find the $\cos(\frac{3\pi}{4})$.

67. Find the $\tan(\frac{3\pi}{2})$.

68. If the $\sin\theta = \frac{5}{13}$, find the $\tan\theta$.

69. If the $\sin\theta = \frac{5}{13}$, find the $\sec\theta$.

70. Solve $\tan(x) = \sqrt{3}$, for $[0, 2\pi)$.

71. Find the amplitude and period of $f(x) = 3\sin(2x)$.

72. Solve for x : $2\cos(x) - 1 = 0$, for $[0, 2\pi)$.

73. Find the reference angle for $\theta = 100^\circ$.

74. Find 2 perpendicular linear equations whose slopes are NOT negative reciprocals.

75. What is so special about October 24th of this year?