

HONORS PRECALCULUS SUMMER PACKET

THE WOODLANDS HIGH SCHOOL

Precalculus Honors is an advanced math course comprised of advanced Algebra and trigonometry. The goal of this course is to prepare students for AP Calculus – AB and BC. Success in honors Precalculus requires a mastery of previously-taught Algebra skills. The following summer packet is designed to provide review and practice for critical Algebra skills that were taught in previous math courses and are prevalent throughout Precalculus. Some of these topics will be briefly reviewed in class as we move through the first nine weeks, and the content in this packet will be assessed during the first nine weeks.

When completing the packet, be sure to show all of your work. If you use a separate piece of paper, be sure to number each question. If you are struggling with the content, seek help from a friend, parent, or go to YouTube or Khan Academy and search for the specific topics. There are many great resources and aids out there. There will be some opportunities to ask questions during the first couple of weeks of school.

This packet should be completed without a calculator. Avoid the temptation to use Photomath or other math apps. Although using such aids will make completing the packet easier, they will cause you to struggle throughout your precalculus experience, which could potentially impact the math courses you are prepared for in the future.

We look forward to a great school year!

Honors Precalculus Summer Packet – Algebra Review

Algebra Review #1 – Factoring – Factor completely.

1. $\frac{15x^2}{4} - \frac{x}{4} - \frac{3}{2}$

2. $2x^3 + 6x^2 - 18x - 54$

3. $3x^6 - 192y^3$

4. $x^3y - 25xy^3$

5. $4x^2 - 27x + 45$

6. $5c^{100} - 80d^{100}$

7. $\frac{2}{3}x^2 + \frac{11}{3}x + 4$

8. $x^5 - 4x^3 - x^2y^3 + 4y^3$

9. $12x^2 - 72xy + 108y^2$

10. $\frac{1}{6}x^4 - \frac{2}{3}x^3 + \frac{1}{2}x^2 - 2x$

11. $x^2 + 3x + \frac{9}{4}$

12. $192x^2 - 3$

13. $4x^3 + 8x^2 - 9x - 18$

14. $216 - x^3$

15. $(\# + ?)^2 - 9(\# + ?) - 52$

Algebra Review #2 – Solving Equations/Inequalities – Solve.

16. $\left|\frac{1}{2}y+4\right|-5=1$

17. $6\left|\frac{1}{2}x-5\right|=18$

18. $|7x-2|=x+4$

19. $x^3-2x^2+7x-14=0$

20. $4(x-3)^2+8=40$

21. $2x^2+\frac{4}{3}x+\frac{11}{3}=0$

22. $3(x-6)^2+5=77$

23. $x^3+3x^2-5x-15=0$

24. $36x^3=9x$

25. $2x^2-13x+20=0$

26. $5x^2+29x+20=0$

27. $\frac{1}{3}|2x-3|+3\leq 7$

28. $5|2-3x|-7>13$

29. $1-\left|\frac{1}{4}x+8\right|>\frac{3}{4}$

30. $2|4y-9|-3\leq 11$

Algebra Review #3 – Rational Expressions & Complex Fractions – Simplify completely.

31. $\frac{3x-1}{x^2+2x-3} - \frac{x+4}{x^2-9}$

32. $\frac{y-9}{y^2-16} - \frac{7-y}{16-y^2}$

33. $\frac{2x}{x-5} - \frac{5}{5-x}$

34. $5(x-3)^{-1} + 4(x+3)^{-1} - 2(x+3)^{-2}$

35. $\frac{2}{3} + \frac{x}{2x+1} - \frac{x+1}{2x^2-5x-3}$

36. $\frac{3}{x-1} - \frac{2}{x} + \frac{x+3}{x^2-1}$

37. $\frac{2x^{-1}-4}{2x^{-1}+3}$

38. $\frac{\frac{1}{x+h-4} - \frac{1}{x-4}}{h}$

$$39. \frac{x}{x^2-9} + \frac{x+1}{x^2+6x+9}$$

$$40. \frac{\frac{1}{2x-5} - \frac{7}{8x-20}}{\frac{x}{2x-5}}$$

$$41. \frac{\frac{1}{x} + \frac{1}{2x}}{\frac{x+4}{x-2}}$$

$$42. \frac{4 + \frac{12}{2x-3}}{5 + \frac{15}{2x-3}}$$

$$43. \frac{\frac{a^3+b^3}{a^2-b^2}}{\frac{a^2-ab+b^2}{a^2-2ab+b^2}}$$

$$44. \frac{1-3a^{-1}}{1-2a^{-1}-3a^{-2}}$$

$$45. \frac{\frac{x}{1-x} + \frac{1+x}{x}}{\frac{1-x}{x} + \frac{x}{1+x}}$$

Algebra Review #4 – Quadratics & Imaginary Numbers

Simplify completely.

46. $i^{71} - i^{49}$

47. $(-2 + 2i)^2$

48. $\frac{1+i}{(1-i)^2}$

49. $\frac{\sqrt{2}+i}{\sqrt{2}-i}$

50. $\frac{(3+2i)(4-5i)}{2+6i}$

51. $(3-5i)(2+4i)$

52. $(6-\sqrt{6})(2+\sqrt{3})$

53. $\frac{5-3i}{1-2i}$

54. $i^{103} - i^{27}$

Solve.

55. $x^2 + 10x + 23 = 0$

56. $2x^2 + 2x + 4 = 0$

57. $5x^2 + 3x = 9$

58. $\frac{3}{x} + \frac{x}{3} = \frac{5}{2}$

59. $\frac{16}{25}x^2 - 1 = 0$

60. Solve using square roots $4(x-7)^2 - 6 = 74$

61. Solve using quadratic formula $3x^2 + 4x - 8 = 0$

62. Solve by completing the square $3x^2 - 12x = -4$

Algebra Review #5 – Writing Equations of Lines

Write the equation of each line given the slope and a point or given two points. Write your equation in the form indicated.

Slope-Intercept Form: $y = mx + b$

Standard Form: $Ax + By = C$ (no fractions, x is listed first and is positive)

General Form: $Ax + By - C = 0$ (no fractions, x is listed first and is positive)

Point-Slope Form: $y - y_1 = m(x - x_1)$

63. Slope-intercept form

$$m = \frac{2}{5}; \text{ pt } (-3, -4)$$

64. Standard form

$$m = -4; \text{ pt } (6, -8)$$

65. General form
(-3, -3) and (2, 1)

66. Standard form
 $m = \text{undefined}$; pt (3, -5)

67. Slope-intercept form
 $m = 0$; (2, 9)

68. Standard form
(1, -4) and (-2, 6)

69. Write the equation of the line, in slope-intercept form, that passes through (-2, 3) and is parallel to $4x - y = 3$.

70. Write the equation of the line, in standard form, that passes through (-1, -4) and is perpendicular to $y = 2x + 5$.

71. Write the equation of the line, in slope-intercept form, given that $f(-5) = -4$ and $f(0) = 11$.
72. Write the equation of the line, in general form, given that $f(-1) = 2$ and $f(3) = -4$.
73. Write the equation of the line that is perpendicular to $y = -2$ and passes through the point $(-6, 2)$.
74. Write the equation of the line, in general form, given that $f(-5) = -2$ and $f(-3) = 8$.
75. Write the equation of the line perpendicular to the y-axis.