Name

Work for entering Honors Precalculus

Summer Work 2026

Complete the following problems over the summer and have them ready for THE FIRST DAY OF SCHOOL. They should be completed WITHOUT THE USE OF A CALCULATOR. Answer each and show all work to support your answer. You may show work in the packet or on notebook paper stapled to the back of this packet. Work should be easy to read and answers should be easy to locate. You WILL be tested on this material.

Short Answer

Write a brief explanation of the meaning for each.

1. $f(2) = 5$

2. The equation is a function.

3. The zeroes of a function are -1 and 4.

4. $f^{-1}(x)$

5. Explain why $(x+2)^2 \neq x^2 + 4$. What does it equal?

Exponents

Simplify each of the following expressions.

6. $6y^2(2y^4)^2$

7. $\left(\frac{x^{-3}y^4}{5}\right)^3$

8. $(4a^{-2}b^3)^{-3}$

9. $36^{3/2}$

10. $-\frac{125}{7}^{-1/3}$

Radicals

Simplify each of the following expressions.

11. $\sqrt{288}$ 11. _____

12. $\sqrt[3]{24}$ 12. _____

13. $3\sqrt{12} + 2\sqrt{300}$ 13. _____

14. $\frac{4}{1-\sqrt{5}}$ 14. _____

15. $(2\sqrt{5}+3)(\sqrt{5}-1)$ 15. _____

Factoring

Factor completely.

16. $9x^3y - 25xy^3$ 16. _____

17. $x^3 + 7x^2 - 18x$ 17. _____

18. $8y^3 + 24y^2 - 7y - 21$ 18. _____

19. $27x^3 - 8$ 19. _____

20. $2y^3 - 7y^2 - 15y$ 20. _____

21. $x^4 - 2x^2 - 8$ 21. _____

Rational Expressions

Simplify each of the following expressions.

22. $\dfrac{x^3 - 9x}{x^2 - 7x + 12}$ 22.

23. $\dfrac{2}{x^2 - 4} - \dfrac{1}{x^2 - 3x + 2}$ 23.

24. $\dfrac{x^2 + xy - 2y^2}{x^3 + x^2y} \cdot \dfrac{x}{x^2 + 3xy + 2y^2}$ 24.

25. $\dfrac{2x^2 + 6x}{4x^3 + 4x^2} \div \dfrac{x^2 + 2x - 3}{x^2 + 3x + 2}$ 25.

26. $\dfrac{9 - \frac{1}{x^2}}{3 + \frac{1}{x}}$ 26.

27. $\dfrac{2 + x^{-1} - x^{-2}}{1 + 4x^{-1} + 3x^{-2}}$ 27

Solving Equations and Inequalities

Solve the following equations. Use the method indicated, if stated.

28. $\sqrt{4x - 9} - \sqrt{5x - 4}$ 28.

29. $x^2 + 2x - 3 \leq 0$ 29.

30. $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^2-6x+8}$ 30.

31. Solve by factoring: $2x^2-5x=3$ 31.

32. Solve by quadratic formula: $4x-3x^2=1$ 32.

33. Solve the system: $\begin{cases}3x-y=-5\\2x+3y=4\end{cases}$ 33.

34. Solve using synthetic division: $x^3-2x^2-29x+30=0$ 34.

Linear Equations

Write the following equations in slope-intercept form: $y = mx + b$.

35. The line containing the point $(4, -7)$ and having a slope of $\frac{5}{2}$.

36. The line containing the point $(-13,\ 5)$ and parallel to $4x + 2y = -7$.

37. The line containing the point $(0, -2)$ and perpendicular to $x - 4y = 3$.

38. The line containing the point $(2,\ 9)$ and having a slope of 0.

39. The perpendicular bisector of the segment between $(-5,\ 3)$ and $(12,\ 3)$.

Functions

Given $f(x) = 4x - 1$ and $g(x) = x + 6$, find the following compositions.

40. $(f + g)(x)$ 40.

41. $(f \circ g)(x)$ 41.

42. $(g - f)(-3)$ 42.

43. $f(x) \cdot g(x)$ 43

44. $g\left(f(g(x))\right)$ 44.

45. $f^{-1}(x)$ 45.

For the function $f(x) = x^2 - 6x + 8$, find the following.

46. $f(-2)$ 46.

47. $f\left(\frac{1}{2}\right)$ 47.

48. $f(n-2)$ 48.

Function Analysis

Find the domain and any zeroes of each of the following functions. Use a sign chart to determine intervals where the function is positive and negative.

49. $F(x) = (x+5)(x-8)$ 49.

50. $g(x) = \frac{x+1}{x+2}$ 50.

51. $Q(x) = \frac{x-5}{(x+2)(x-5)}$ 51. _____

52. $P(x) = \sqrt{2x-1}$ 52.

Logarithms and Exponentials

53. Simplify: $\log_3 \frac{1}{27}$ 53.

54. Expand the logarithm: $\ln \frac{x^2}{z^3\sqrt{y}}$ 54.

55. Condense to a single logarithm: $3\log_b x - 2\log_b x$ 55. _____

56. Solve: $\log_3(x+3) + \log_3(x-3) = 4$ 56. _____

57. Solve: $5^{1-x} = 8$

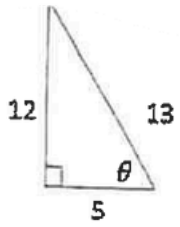
57.

58. Solve: $4^{x^2+4x} = \frac{1}{64}$

58.

Geometry Review

59. Find $\sin\theta$, $\cos\theta$, and $\tan\theta$ for the triangle shown.



60. Complete the table below for a $30° - 60° - 90°$ triangle.

Short Leg	Long Leg	Hypotenuse
8		
	$2\sqrt{3}$	
		$6\sqrt{3}$

61. Complete the table below for a $45° - 45° - 90°$ triangle.

Leg	Leg	Hypotenuse
6		
	10	
		$4\sqrt{5}$

Graph Transformations

Given the following equations, state the transformations of the graphs.

62. $y = (x-2)^2 + 4$

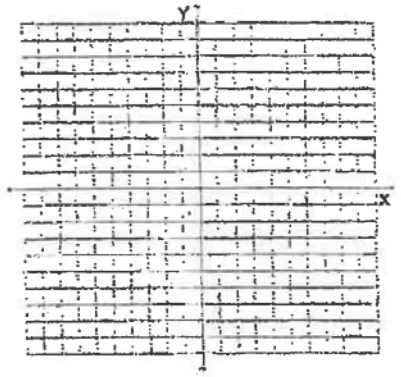
63. $y = 2|-x-5-2$

64. $y = -\frac{1}{2}|x+4|$

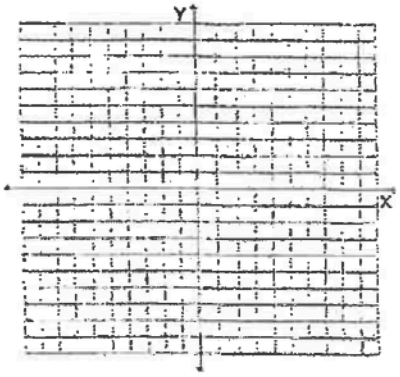
Parent Graphs

Graph each function and clearly indicate units on the axes.

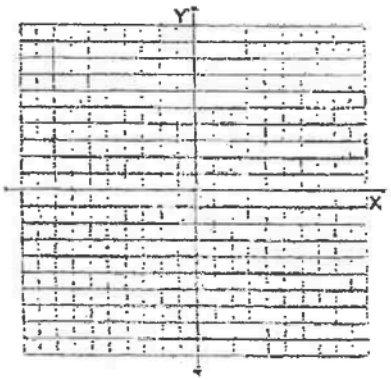
65. $f(x) = x$



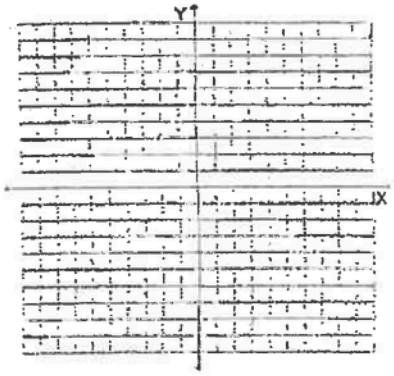
66. $f(x) = x^2$



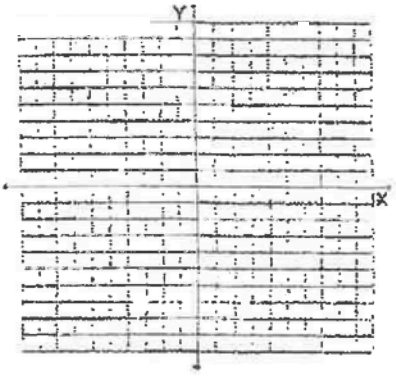
67. $f(x) = x^3$



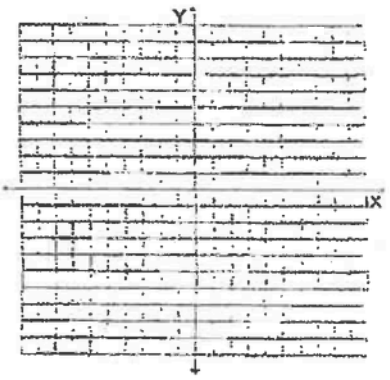
68. $f(x) = |x|$



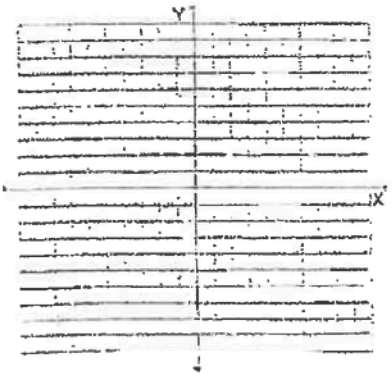
69. $f(x) = 2^x$



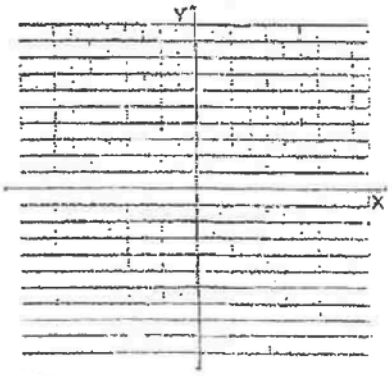
70. $f(x) = \log x$



71. $f(x) = \frac{1}{x}$



72. $f(x) = \sqrt{x}$



73. $f(x) = \sqrt[3]{x}$

