Name _____

Work for entering **Algebra 3 / Trigonometry**

Summer Work 2025

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

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

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

9. $36^{3/2}$ 9. _____

10. $\left(-\frac{125}{27}\right)^{-1/3}$ 10. _____

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. _____

FACTOR THE FOLLOWING AS MUCH AS POSSIBLE

22 $x^2 - 4x$ 22. _____

23 $a^2 - 16$ 23. _____

24 $x^2 - 4x + 4$ 24. _____

25 $s^2 + 5s + 4$ 25. _____

26 $2x^2 - 3x - 9$ 26. _____

27 $x^2 - 81$ 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 solve for x

$$x^2 - 6x + 4 = 20$$

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. f(x) = |x+1| 50. _____

51. f(x) = 3x+ 2 51. _____

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

SIMPLIFY THE FOLLOWING, ANSWER SHOULD NOT INCULDE DECIMALS.

53. $(7x-2y)-(3x+5y)$ 53. _____

54 $3\frac{2}{3}-2\frac{1}{2}$ 54. _____

55 $7(3x^2+10x)-4x$ _____

56. $\left(\frac{5u^2}{2v^2}\right)^2$ _____

57. $\sqrt{17}+5\sqrt{17}$

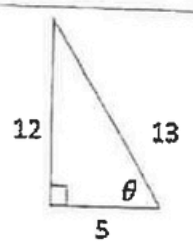
57. _____

58. $1\frac{2}{3}+4\frac{1}{5}-3\frac{5}{6}$

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

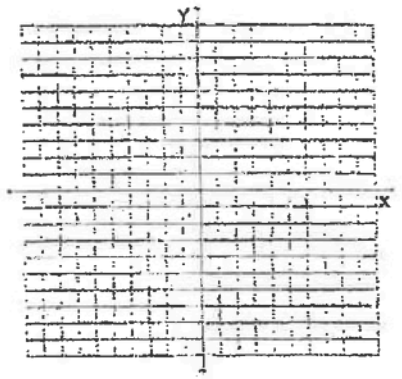
63. $y = \sqrt{2-x} - 5 - 2$

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

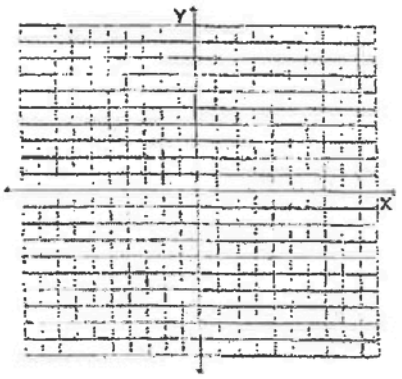
Parent Graphs

Graph each function and clearly indicate units on the axes.

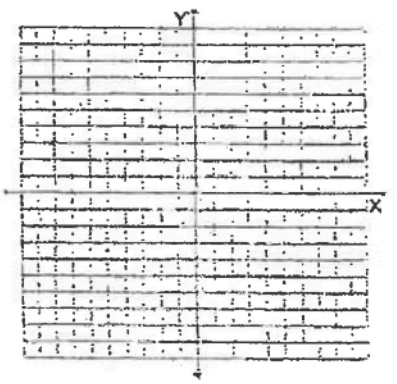
65. $f(x) = x$



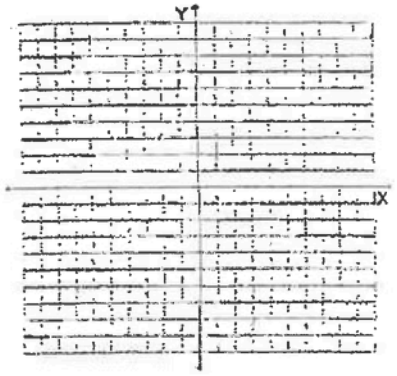
66. $f(x) = x^2$



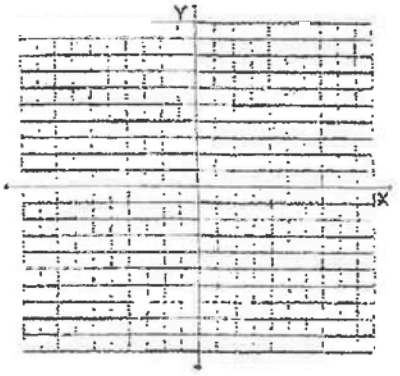
67. $f(x) = x^3$



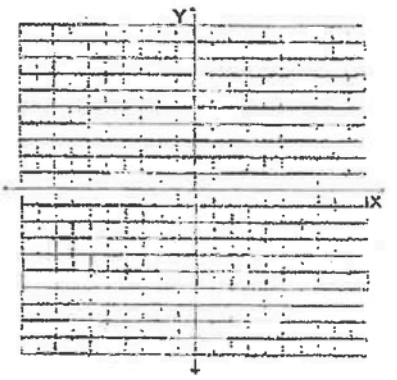
68. $f(x) = |x|$



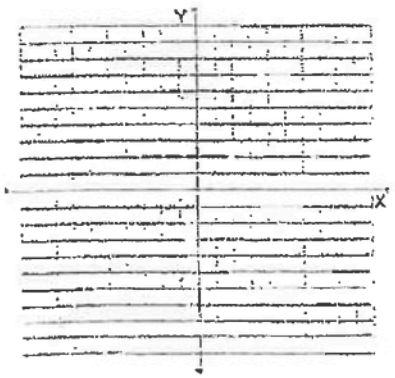
69. $f(x) = 2^x$



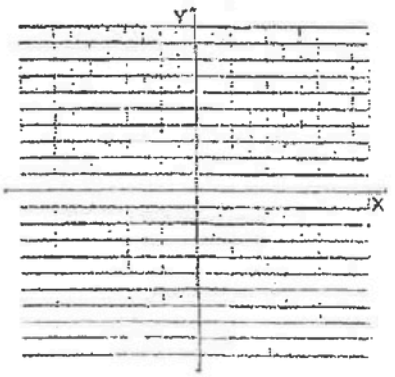
70. $f(x) = \log x$



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



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



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