Name:_____ **CIRCLE ALL ANSWERS!!!** **Precalculus**

1. Combine the following fractions and express in fully reduced form.

$$\frac{3}{4x} + \frac{2}{x}$$

2. Combine the following fractions and express in fully reduced form.

$$\frac{5}{2x-1} - \frac{-4}{2x-1}$$

3. Combine the following fractions and express in fully reduced form.

$$\frac{x}{6} - \frac{2x}{3}$$

4. Perform the operation and combine to one fraction.

$$3 + \frac{1}{x+6}$$

5. Perform the operation and combine to one fraction.

$$\frac{7}{x+1} - \frac{2x}{x+3}$$

6. Perform the operation and combine to one fraction.

$$\frac{1}{x-10} - \frac{7}{10-x}$$

7. Perform the following operation and express in simplest form.

$$\frac{3x}{x-2} \cdot \frac{x^2-4}{x^2+3x+2}$$

8. Perform the following operation and express in simplest form.

$$\frac{x^2+5x-36}{x+5} \div \frac{x^2-16}{x+4}$$

9. Perform the following operation and express in simplest form.

$$\frac{3x}{2x} \div \frac{x^2-81}{x^2+11x+18}$$

10. Fully simplify: $\frac{\frac{x-7}{10}+\frac{1}{x}}{\frac{1}{2}-\frac{x}{4}}$

11. Fully simplify: $\frac{\frac{1}{x^2}-1}{\frac{x+6}{5}+\frac{1}{x}}$

12. Fully simplify: $\frac{\frac{2}{x}-1}{\frac{x-7}{10}+\frac{1}{x}}$

13. Write the expression below as a single logarithm in simplest form.

$$3\log_b 3 - \log_b 9$$

14. Write the expression below as a single logarithm in simplest form.

$$2\log_b 10$$

15. Write the expression below as a single logarithm in simplest form.

$$\log_b 10 + \log_b 10$$

16. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$.

$$\log 2x^4$$

17. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$, and $\log y$.

$$\log \frac{x^4}{y}$$

18. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$, and $\log y$.

$$\log x^2 y$$

19. Express as a complex number in simplest a+bi form:

$$\frac{-22 - 10i}{3 + 8i}$$

20. Express as a complex number in simplest a+bi form:

$$\frac{4 - 3i}{-5 - 3i}$$

21. Express as a complex number in simplest a+bi form:

$$\frac{-10 - 7i}{6 + 8i}$$

22. Convert the angle $\frac{5\pi}{3}$ radians to degrees.

23. Convert the angle -4 radians to degrees, rounding *to the nearest 10th.*

24. Convert the angle $\frac{5\pi}{2}$ radians to degrees.

25. Convert the following angle from degrees to radians. Express your answer in simplest form.

$$195^\circ$$

26. Convert the following angle from degrees to radians. Express your answer in simplest form.

$$480^\circ$$

27. Convert the following angle from degrees to radians. Express your answer in simplest form.

$$600^\circ$$

28. Simplify the expression completely if possible.

$$\frac{x^2 - 9x}{2x^2}$$

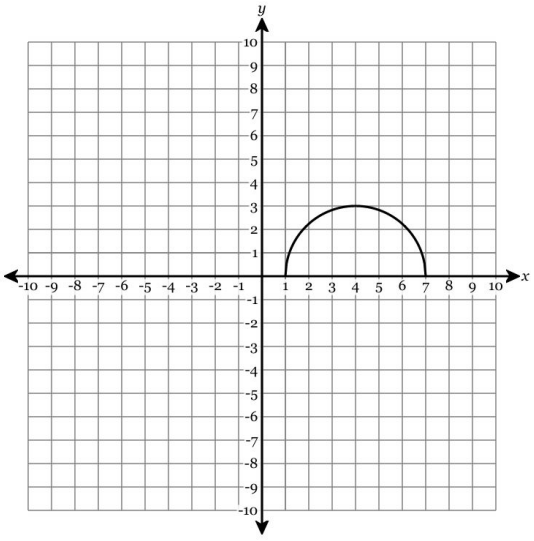
29. Simplify the expression completely if possible.

$$\frac{x^2 - 16}{x^3 + 4x^2}$$

30. Simplify the expression completely if possible.

$$\frac{3x^2 + 9x}{x^2 - 7x + 10}$$

31. What is the domain of the function shown in the graph below?



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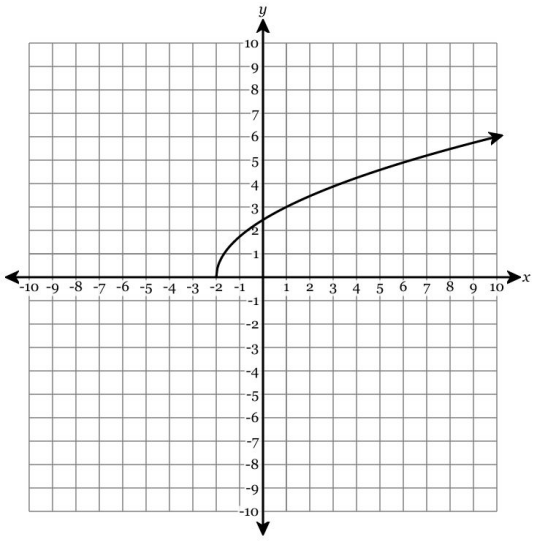

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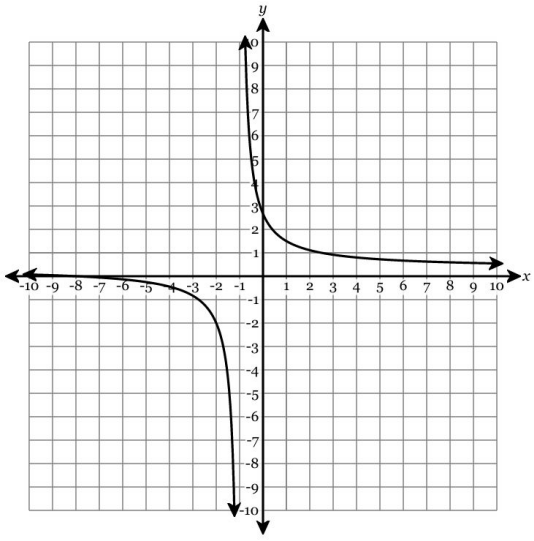
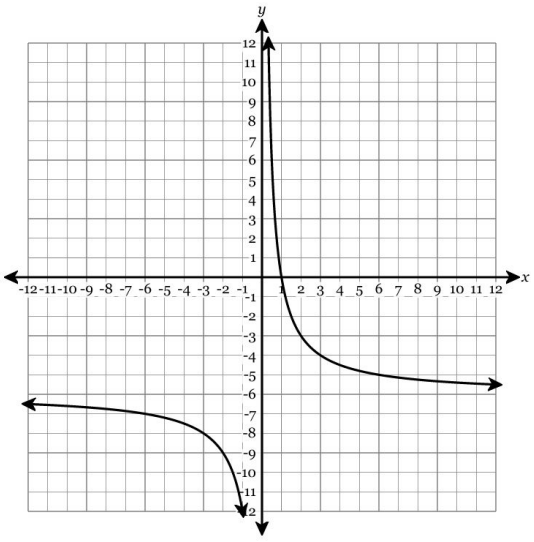


34. What is the range of the function shown in the graph below?



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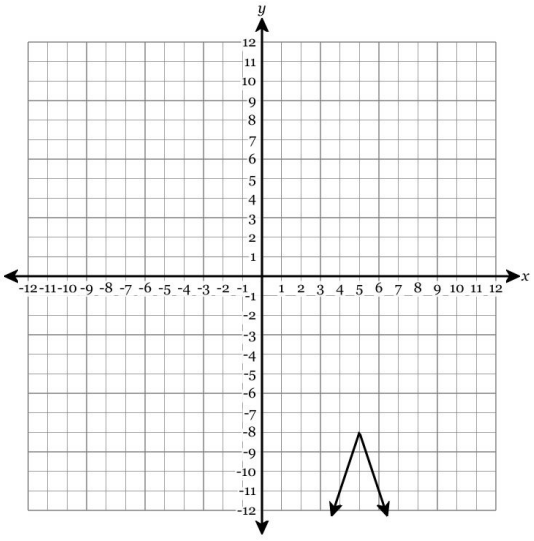

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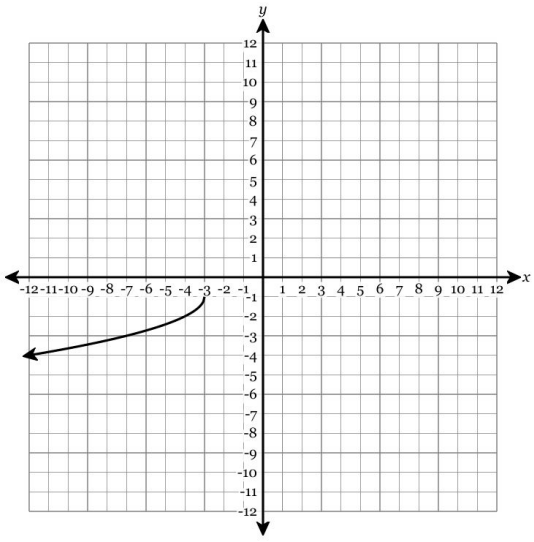

37. Solve the equation for all values of x.

$$|5x - 6| - 6 = 2x$$

38. Solve the equation for all values of x.

$$|4x + 7| - 2 = 5x$$

39. Solve the equation for all values of x.

$$|2x + 3| = x$$

40. Solve the following inequality *algebraically*.

$$5|x - 6| - 5 < 45$$

41. Solve the following inequality *algebraically*.

$$4|x - 5| + 7 \geq 51$$

42. Solve the following inequality *algebraically*.

$$2|x+7|-1 \leq 11$$

43. Solve for a positive value of x.

$$\log_2(128) = x$$

44. Solve for a positive value of x.

$$\log_x(16) = 4$$

45. Solve for a positive value of x.

$$\log_8(x) = 3$$

46. Write the log equation as an exponential equation. You do not need to solve for x.

$$\log_{5x}(5x) = 2x$$

47. Write the log equation as an exponential equation. You do not need to solve for x.

$$\log(x-9) = 2$$

48. Write the log equation as an exponential equation. You do not need to solve for x.

$$\log_8(5x+9) = 3$$

49. If x and y are in direct proportion and y is 3 when x is 9, find y when x is 12.

50. If x and y vary directly and y is 2 when x is 6, find y when x is 15.

51. If x and y vary directly and y is 32 when x is 4, find y when x is 12.

52. If p is inversely proportional to the square of q, and p is 6 when q is 8, determine p when q is equal to 2.

53. If p and q vary inversely and p is 21 when q is 23, determine q when p is equal to 7.

54. If p and q vary inversely and p is 4 when q is 7, determine q when p is equal to 2.

55. Use the long division method to find the result when $x^3+6x^2+10x+25$ is divided by $x+5$.

56. Use the long division method to find the result when $4x^3+5x^2+17x+4$ is divided by $4x+1$.

57. Use the long division method to find the result when $4x^3+9x^2+9x+5$ is divided by $4x+5$.

58. Use the long division method to find the result when $6x^3-13x^2+12x+4$ is divided by $3x-2$. If there is a remainder, express the result in the form $q(x)+\frac{r(x)}{b(x)}$.

59. Use the long division method to find the result when $4x^3 + 7x^2 - 13x - 20$ is divided by $4x + 3$. If there is a remainder, express the result in the form $q(x) + \frac{r(x)}{b(x)}$.

60. Use the long division method to find the result when $3x^3 + 19x^2 + 28x - 6$ is divided by $x + 3$. If there is a remainder, express the result in the form $q(x) + \frac{r(x)}{b(x)}$.

61. Expand the expression to a polynomial in standard form:

$$(4x + 3)(2x^2 - 4x + 5)$$

62. Expand the expression to a polynomial in standard form:

$$(3x - 2)(2x^2 - 3x - 3)$$

63. Expand the expression to a polynomial in standard form:

$$(x - 2)(3x^2 - 4x - 3)$$

64. Solve for the roots in *simplest form* by completing the square:

$$x^2 - 8x - 34 = 0$$

65. Solve for the roots in *simplest form* by completing the square:

$$x^2 - 12x + 39 = 0$$

66. Solve for the roots in *simplest form* by completing the square:

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

67. What are the roots of the equation $x^2 - 6x + 25 = 0$ in simplest $a + bi$ form?

68. What are the roots of the equation $x^2 - 6x + 18 = 0$ in simplest $a + bi$ form?

69. What are the roots of the equation $x^2 - 6x + 10 = 0$ in simplest $a + bi$ form?

70. Solve for the roots in *simplest form* using the quadratic formula:

$$4x^2 + 1 = 12x$$

71. Solve for the roots in *simplest form* using the quadratic formula:

$$3x^2 + 87 = -18x$$

72. Solve for the roots in *simplest form* using the quadratic formula:

$$2x^2 + 32 = -20x$$

73. Express the product $\left(3 - \sqrt{7}\right)\left(3 + \sqrt{7}\right)$ in simplest form.

74. Express the product $\left(\sqrt{6}+5\right)\left(\sqrt{6}+5\right)$ in simplest form.

75. Express the product $\left(\sqrt{2}+\sqrt{7}\right)\left(\sqrt{2}-\sqrt{7}\right)$ in simplest form.