

Name_____

Date_____

Precalculus

Summer Assignment for Students Entering Precalculus

Directions:

- **Complete this assignment WITHOUT the use of a calculator.**
- **All work must be shown to receive credit.**
- **Write answers in the space provided.**
- **Complete this assignment before the first day of class and be ready to hand it in, fully complete, on the first day of class.**

Note to the Student:

The purpose of this assignment is to review topics that are essential to your success in Precalculus. It will be assumed that all of the topics covered in this assignment, and in your previous math courses, have been mastered and will not need explanation as we use them in the precalculus course.

Please make sure that you complete this assignment no earlier than a month before school starts. You want to make sure to give yourself time to identify and relearn concepts you have difficulty with but you don't want to do it too early in the summer that you forget the material.

This assignment will have some weight in your first quarter grade, to be determined by the teacher of your class.

We hope you have a great summer and look forward to seeing you in the fall!

The Birch Math Department

Operations with Fractions

Perform the indicated operation and write your answer in simplest form.

1) $\frac{3}{4} + \frac{7}{4}$

Answer_____

2) $\frac{2}{3} \cdot \frac{9}{5}$

Answer_____

3) $\frac{8}{3} - \frac{6}{5}$

Answer_____

4) $\frac{7}{2} \div \frac{5}{8}$

Answer_____

5) $\left(\frac{3}{2}\right)^2$

Answer_____

6) $4\left(\frac{5}{2}\right)^3$

Answer_____

GCF

Find the greatest common factor of the following group of numbers.

Watch: <https://www.khanacademy.org/math/pre-algebra/pre-algebra-factors-multiples/pre-algebra-greatest-common-divisor/v/greatest-common-divisor-factor-exercise>

7) 24, 72

8) 18, 108

Answer _____

Answer _____

9) 36, 72, 144

10) 42, 63, 108

Answer _____

Answer _____

LCM

Find the lowest common multiple of the following groups of numbers.

Watch: <https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/adding-and-subtracting-rational-expressions/v/least-common-multiple-exercise>

11) 12,18

12) 24,36

Answer _____

Answer _____

13) 6,14,20

14) 5,12,20

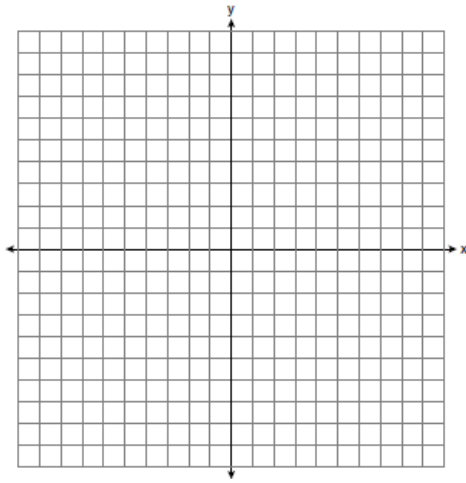
Answer _____

Answer _____

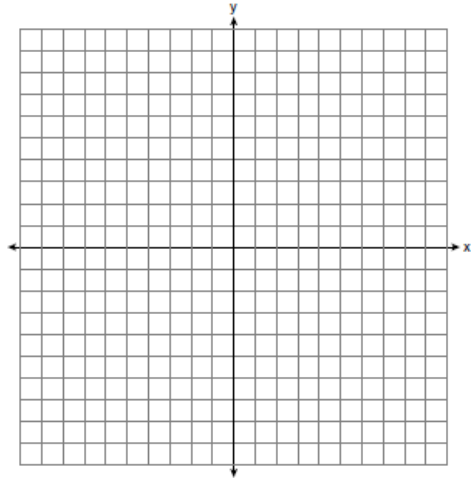
Piecewise Functions

Graph the following piecewise functions.

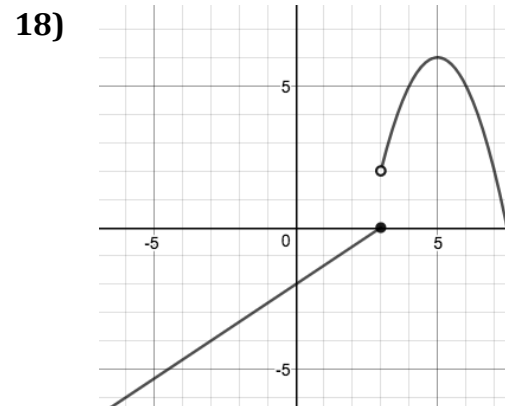
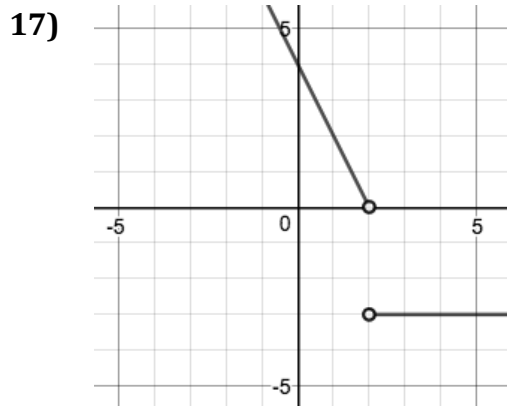
15)
$$f(x) = \begin{cases} 2x+1 & \text{if } x < 3 \\ -\frac{1}{2}x-2 & \text{if } x \geq 3 \end{cases}$$



16)
$$f(x) = \begin{cases} x^2 - 2x + 1 & \text{if } x < -2 \\ -3x + 1 & \text{if } x \geq -2 \end{cases}$$



Write the function whose graph is shown.



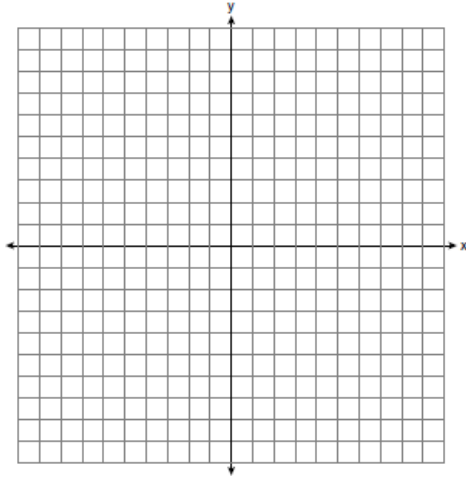
Answer _____

Answer _____

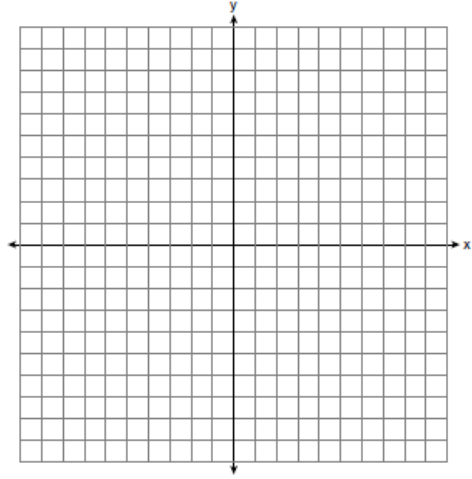
Absolute Value Graphs

Graph the following functions.

19) $f(x) = |x - 3| + 4$



20) $f(x) = -\frac{1}{2}|x + 2| + 3$



Absolute Value Equations

Solve the following equations. Check your solutions.

21) $|x| = 3$

22) $|x - 4| = 6$

Answer_____

Answer_____

23) $-2|3x + 1| - 5 = -9$

24) $2\left|\frac{1}{3}x - 1\right| + 4 = 2$

Answer_____

Answer_____

Solving Absolute Value Inequalities

Solve the following inequalities.

25) $3|2x - 4| > 12$

26) $-\frac{2}{3}|x + 3| - 3 \leq -9$

Answer_____

Answer_____

Systems of Equations

Solve the following systems of equations.

27) $x = 2y + 1$
 $2x + 3y = -13$

28) $-2x + 3y = 7$
 $5x + 7y = 26$

Answer_____

Answer_____

Factoring

Factoring each expression completely.

29) $x^2 + 7x + 12$

30) $x^2 - 4x - 21$

Answer_____

Answer_____

31) $x^2 - 49$

32) $5x^2 - 15x$

Answer_____

Answer_____

33) $8x^2 - 18$

34) $2x^2 - 15x$

Answer_____

Answer_____

35) $3x^2 + 13x - 10$

36) $3x^2 + 7x + 2$

37) **Answer**_____

$x^3 - 8$

38) **Answer**_____

$54x^3 + 128$

Answer_____

39) $x^3 - x^2 - 4x + 4$

Answer_____

40) $12x^5 - 9x^4 + 4x^3 - 3x^2$

Answer_____

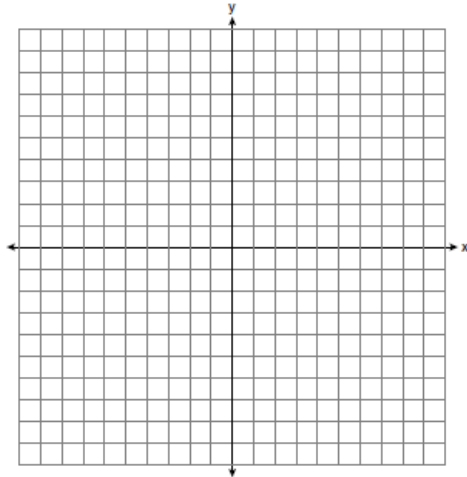
Answer_____

Graphing Quadratic Functions

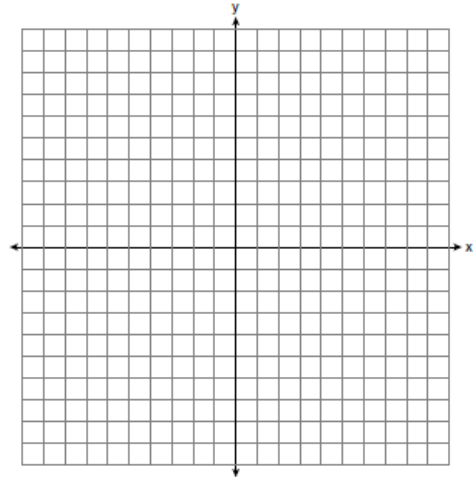
Graph each of the following quadratic functions.

41) $f(x) = x^2 - 4x - 12$

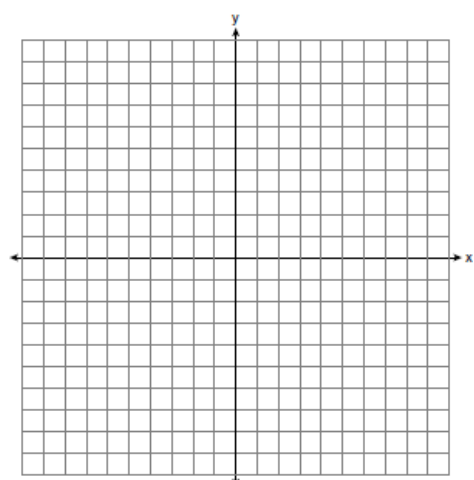
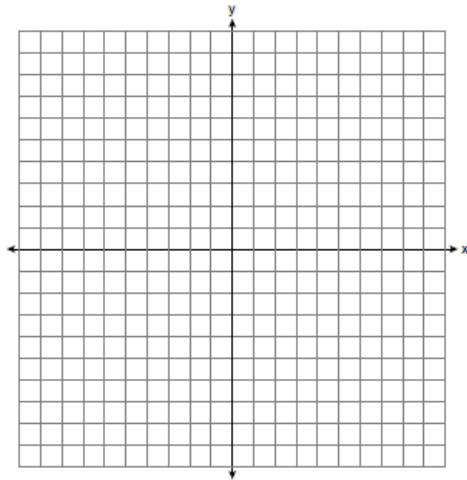
42) $f(x) = -2x^2 + x + 6$



43) $f(x) = 2(x - 3)(x + 4)$



44) $f(x) = -(x - 4)^2 + 2$



Solving Quadratic Equations

Solve each of the following quadratic equations. Make sure to review all methods for solving.

45) $x^2 + 6x + 5 = 0$

46) $x^2 + 8x + 11 = 0$

Answer_____

Answer_____

47) $(x-2)^2 + 4 = 10$

48) $2x^2 + 13x + 19 = 4$

49) $60x^2 + 4x - 60 = 100$ **Answer**_____

50) $(2x-4)^2 - 3x = 12$ **Answer**_____

51) $3x^2 = -12x - 9$ **Answer**_____

52) $3x^2 - 5x + 3 = 2x - 4$ **Answer**_____

Answer_____

Answer_____

Simplifying Radicals

Simplify the following radical expressions.

53) $\sqrt{80}$

54) $3\sqrt{45}$

55) $3\sqrt{5} \cdot 8\sqrt{2}$ Answer_____

56) $7\sqrt{2} - 10\sqrt{2}$ Answer_____

57) $2\sqrt{27} + 5\sqrt{3}$ Answer_____

58) $\frac{\sqrt{21}}{\sqrt{3}}$ Answer_____

59) $\frac{3\sqrt{14}}{2\sqrt{5}}$ Answer_____

60) $\frac{5}{1+\sqrt{2}}$ Answer_____

Answer_____

Answer_____

61) $(3\sqrt{5})^2$

62) $(2-3\sqrt{5})(4\sqrt{2}+2\sqrt{6})$

Answer_____

Answer_____

Properties of Exponents

Simplify the following expressions. No negative exponents.

63) $x^4 \cdot x^7$

64) $x^{-4} \cdot x^{-1}$

Answer_____

Answer_____

65) $\frac{x^5}{x^3}$

66) $\frac{5x^4y^3}{25x^{-2}y^5}$

Answer_____

Answer_____

67) $(x^4)^3$

68) $\left(\frac{2x^3}{3x^5}\right)^4$

Answer_____

Answer_____

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

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

Answer_____

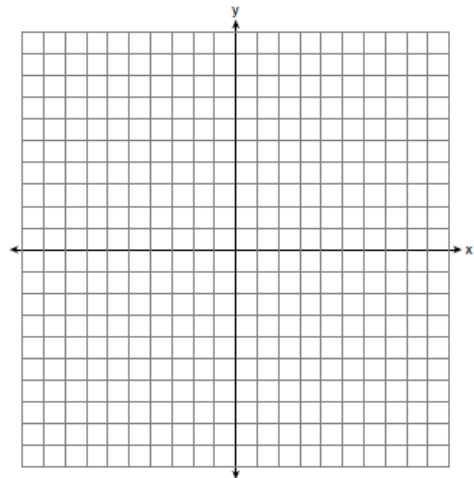
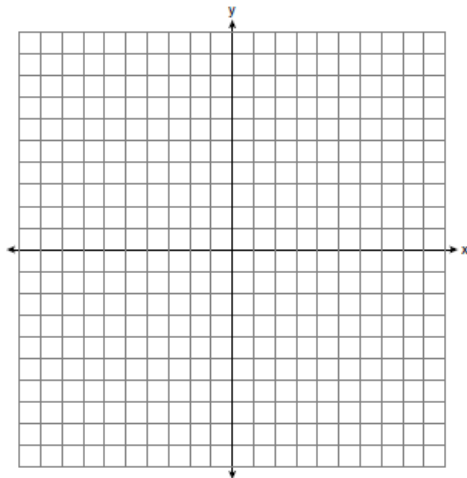
Answer_____

Graphing Polynomial Functions

Graph each of the following functions.

71) $f(x) = 2(x-3)^2(x+4)^3$

72) $f(x) = x^3 + x^2 - 17x + 15$



Synthetic and Long Division

Use synthetic or long division to find the quotient.

73) $(x^3 - x^2 - x - 2) \div (x + 2)$

74) $(x^3 + 5x^2 + 5x - 3) \div (x^2 + 3x - 1)$

Answer_____

Answer_____

Solving Polynomial Equations

75) $x^3 - 27 = 0$

76) $2x^3 + 18x^2 - 5x - 45 = 0$

Answer_____

Answer_____

77) $x^3 - 2x^2 - 11x + 12 = 0$

78) $3x^4 - 5x^3 - 5x^2 + 5x + 2 = 0$

Answer_____

Answer_____

Rational Exponents

Find the exact simplified value for each expression.

79) $25^{\frac{3}{2}}$

80) $(-27)^{-\frac{4}{3}}$

Answer_____

Answer_____

81) $-(32)^{\frac{2}{5}}$

82) $(\sqrt{3})^6$

Answer_____

Answer_____

Solving Radical Equations

Solve each of the following equations.

83) $x^{\frac{2}{3}} = 16$

84) $-2(x-1)^{\frac{5}{3}} + 4 = -60$

85) $4 - \sqrt{x} = 2$ Answer _____

86) $\sqrt[3]{3x-2} - \sqrt[3]{x+1} = 0$ Answer _____

87) $\sqrt{5x^2 + x} - x = 3$ Answer _____

88) $\sqrt{x^2 + 5} = -3$ Answer _____

Answer _____

Answer _____

Simplifying/Operations with Rational Expression

Simplify the following expressions.

89) $\frac{x+7}{x^2+6x-7}$

90) $\frac{56x^2-72x}{32x}$

91) $\frac{2-x}{x^2+4x-12}$ **Answer**_____

92) $\frac{3x^2+5x-2}{7x^2+12x-4}$ **Answer**_____

Answer_____

Answer_____

Perform the operation and write the expression in simplest form.

93) $\frac{x^2+9x-22}{x^2-121} \cdot \frac{1}{2-x}$

94) $\frac{1-x^2}{6x+6} \div \frac{x^4-1}{6x^2+6}$

Answer_____

95) $\frac{1}{x+1} + \frac{1}{x}$

Answer_____

96) $\frac{6}{y-5} - \frac{y+5}{y^2-25}$

Answer_____

Answer_____

Rational Equations

Solve each equation.

97) $\frac{2}{x+3} - \frac{3}{4-x} = \frac{2x-2}{x^2-x-12}$

98) $\frac{1}{x} - \frac{1}{3} = -\frac{1}{3x}$

99) **Answer**_____

$$\frac{3x}{4} = \frac{x+1}{2}$$

100) **Answer**_____

$$\frac{10}{x+3} + \frac{10}{3} = 6$$

Answer_____

Answer_____

**Determine the domain of the
following functions**

101) $f(x) = \sqrt{3x+6}$

102) $g(x) = \frac{5x}{x^2+6x-16}$

Answer _____

Answer _____

For questions 103-106:

$$g(x) = 3x^2 + 2x + 1$$

$$h(x) = \sqrt{3x-8}$$

$$p(x) = -9x - 3$$

103. $g(h(x))$

105. $p(h(8))$

Answer _____

Answer _____

104. $g(p(3))$

106. $g(x+3)$

Answer _____

Answer _____