



**Pre-Calculus
(College Prep)
Summer Math Packet**

Congratulations! You will soon be learning Pre-Calculus!

This summer math packet is a review of some of the concepts learned in your Algebra II course that are needed when you begin your Pre-Calculus course in August. It will assure that all students begin the school year on the same page and with equal opportunity to learn and build upon mathematical concepts that should have been learned in previous courses.

Instructions for completing the packet:

- Please print the packet or use loose leaf paper to complete the packet by hand showing all work. Work must be neat and legible.
- Please use your Algebra II notes or the websites provided to help you if you need reminders on how to complete some practice problems.
- Take notes as you complete your work. You will be given a quiz on this material the first week of school.
- Work on the packet with your friends. Help each other. Every student is responsible for knowing the material in this packet when you return in August. We will review as a team and everyone will be expected to participate.
- Bring your packet to our first class together. It will be collected for a grade. Only packets done with paper and pencil will be accepted.

Helpful Websites:

<http://www.mathtv.com/>

<http://www.purplemath.com/modules/index.htm>

<https://www.khanacademy.org>

Helpful for graphing functions:

<https://www.education.ti.com/en/resources/family-of-functions>

Name _____

SHORT ANSWER.

Solve.

1) The formula $C = \frac{5}{9}(F - 32)$ expresses the relationship between Fahrenheit temperature, F, and Celsius temperature, C. Use the formula to convert 59°F to its equivalent temperature on the Celsius scale. 1) _____

2) A stone is dropped from a tower that is 790 feet high. The formula $h = 790 - 16t^2$ describes the stone's height above the ground, h, in feet, t seconds after it was dropped. What is the stone's height 4 seconds after it is released? 2) _____

Evaluate the expression for the given values of x and y.

3) $\frac{|x|}{x} + \frac{|y|}{y}$; $x = 2$ and $y = -5$ 3) _____

Simplify the algebraic expression.

4) $-4(2x - 9) - 4x + 10$ 4) _____

Evaluate the exponential expression.

5) $3^2 \cdot 3^{-3}$ 5) _____

Simplify the exponential expression.

6) $x^{-4}y$ 6) _____

7) $(-10x^3y)(-10x^6y^2)$ 7) _____

8) $\left(\frac{-5x}{y}\right)^3$ 8) _____

9) $3x^{-4}y^9$ 9) _____

10) $(3x^{-8}y^6z^{-9})^{-2}$ 10) _____

Perform the indicated computation. Write the answer in scientific notation.

11) $(3 \times 10^{-7})(1.9 \times 10^9)$ 11) _____

12) $\frac{12.48 \times 10^{-1}}{4 \times 10^8}$ 12) _____

Solve. Express the result in scientific notation. If necessary, round the decimal factor to two decimal places.

13) In a state with a population of 3,000,000 people, the average citizen spends \$6,000 on housing each year. What is the total spent on housing for the state? 13) _____

Solve the problem.

14) The formula $v = \sqrt{20L}$ can be used to estimate the speed of a car, v , in miles per hour, based on the length, L , in feet, of its skid marks upon sudden braking on a dry asphalt road. If a car is involved in an accident and its skid marks measure 361.25 feet, at what estimated speed was the car traveling when it applied its brakes just prior to the accident? 14) _____

Add or subtract terms whenever possible.

15) $\sqrt{25} + \sqrt{48} + \sqrt{49} + \sqrt{300}$ 15) _____

16) $\sqrt{3x} - 3\sqrt{48x} - 6\sqrt{75x}$ 16) _____

Solve the equation.

17) $\frac{x}{3} - \frac{x}{4} = 9$ 17) _____

18) $\frac{x+4}{6} + \frac{x-1}{2} = \frac{5}{6}$ 18) _____

19) $\frac{1}{4}(x-12) - \frac{1}{9}(x-9) = x-5$ 19) _____

Rationalize the denominator.

20) $\frac{\sqrt{16}}{\sqrt{7}}$ 20) _____

21) $\frac{5}{9 - \sqrt{7}}$ 21) _____

22) $\frac{\sqrt{3}}{\sqrt{13+3}}$ 22) _____

23) $\frac{5}{\sqrt{6} + \sqrt{11}}$ 23) _____

Simplify the radical expression.

24) $\sqrt[3]{42} \cdot \sqrt[3]{36}$ 24) _____

Add or subtract terms whenever possible.

25) $2\sqrt[3]{135} + \sqrt[3]{320}$ 25) _____

$$26) y\sqrt[3]{16x} - \sqrt[3]{128xy^3}$$

26) _____

Evaluate the expression without using a calculator.

$$27) 8^{4/3}$$

27) _____

$$28) 49^{-3/2}$$

28) _____

Simplify using properties of exponents.

$$29) (2x^{2/3})(7x^{1/4})$$

29) _____

$$30) (49x^4y^4)^{1/2}$$

30) _____

Solve the problem.

31) The algebraic expression $0.07d^{3/2}$ describes the duration of a storm, in hours, whose diameter is d miles. Use a calculator to determine the duration of a storm with a diameter of 7 miles. Round to the nearest hundredth.

31) _____

Perform the indicated operations. Write the resulting polynomial in standard form.

$$32) (4x^8 - 5x^7 + 5x^6 + 7) - (9x^8 - 2x^7 - 8x^6 + 8)$$

32) _____

$$33) (6x^2 + 4x + 7) + (2x^2 + 8x + 4) - (5x + 2)$$

33) _____

Find the product.

$$34) (x - 11)(x^2 + 4x - 3)$$

34) _____

$$35) (6x^2 + 5)(5x^2 - 1)$$

35) _____

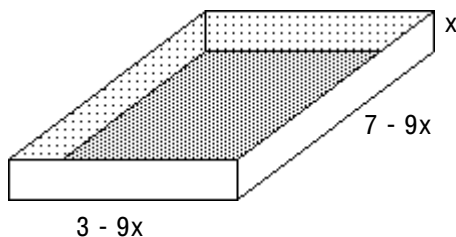
$$36) (5x^2 - 6)^2$$

36) _____

Solve the problem.

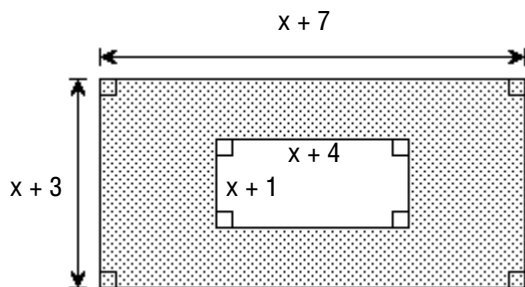
37) Write a polynomial in standard form that represents the volume of the open box.

37) _____



38) Write a polynomial in standard form that represents the area of the shaded region.

38) _____



Factor by grouping. Assume any variable exponents represent whole numbers.

39) $x^3 - 4x^2 - 5x + 20$

39) _____

40) $5x^3 - 20x^2 + 9x - 36$

40) _____

Factor the trinomial, or state that the trinomial is prime.

41) $x^2 - x - 72$

41) _____

42) $5x^2 + 16x + 12$

42) _____

43) $15x^2 - 16x + 4$

43) _____

44) $8x^2 + 6xy - 9y^2$

44) _____

Factor the difference of two squares.

45) $x^4 - 256$

45) _____

Factor using the formula for the sum or difference of two cubes.

46) $125x^3 - 64$

46) _____

Factor completely, or state that the polynomial is prime.

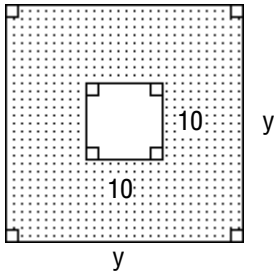
47) $6x^3 - 864x$

47) _____

Solve the problem.

48) Write an expression for the area of the shaded region and express it in factored form.

48) _____



Find all numbers that must be excluded from the domain of the rational expression.

49) $\frac{x + 2}{x^2 - 8x + 12}$

49) _____

Simplify the rational expression. Find all numbers that must be excluded from the domain of the simplified rational expression.

50) $\frac{2x + 2}{6x^2 + 16x + 10}$

50) _____

51) $\frac{2x^2 - 22x + 56}{x - 7}$

51) _____

Multiply or divide as indicated.

52) $\frac{x^2 + 9x + 14}{x^2 + 4x + 4} \cdot \frac{x^2 + 10x + 16}{x^2 + 15x + 56}$

52) _____

53) $\frac{(x + 4)^2}{x - 4} \div \frac{x^2 - 16}{4x - 16}$

53) _____

54) $\frac{7x^2 + 29x - 30}{7x - 28} \cdot \frac{x^2 - 4x}{49x^2 - 36} \div \frac{5x + 25}{3x^3}$

54) _____

Add or subtract as indicated.

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

55) _____

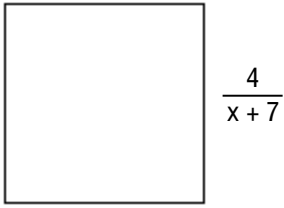
56) $\frac{5x}{x + 1} + \frac{6}{x - 1} - \frac{10}{x^2 - 1}$

56) _____

Solve the problem.

57) Express the perimeter of the square as a single rational expression.

57) _____



Simplify the complex rational expression.

58) $\frac{\frac{6}{x} + 1}{\frac{6}{x} - 1}$

58) _____

59) $\frac{\frac{1}{x+2}}{\frac{5}{x^2-4}}$

59) _____

60) $\frac{\frac{16y^2 - 64x^2}{xy}}{\frac{4}{x} - \frac{8}{y}}$

60) _____

Solve the linear equation.

61) $\frac{x-12}{4} + \frac{x+7}{7} = x+6$

61) _____

First, write the value or values of the variable that make a denominator zero. Then solve the equation.

62) $\frac{3}{x} + 7 = \frac{1}{2x} + \frac{8}{5}$

62) _____

63) $\frac{5}{x} + 6 = \frac{1}{2x} + \frac{11}{3}$

63) _____

Solve the rational equation.

64) $\frac{4}{x-1} + \frac{1}{4x-4} = \frac{17}{4}$

64) _____

Solve the problem.

65) The formula $C = \frac{25,000 + 290x}{x}$ models the average cost per unit, C , for Electrostuff to manufacture x units of Electrogadget IV. How many units must the company produce to have an average cost per unit of \$470? 65) _____

Solve the formula for the specified variable.

66) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$ for c 66) _____

67) $P = \frac{A}{1 + rt}$ for t 67) _____

Solve the absolute value equation or indicate that the equation has no solution.

68) $|x - 2| - 5 =$ 68) _____

69) $3|x - 3| = 18$ 69) _____

Solve the equation by factoring.

70) $x^2 + 4x - 77 = 0$ 70) _____

71) $3x(x - 5) = 7x^2 - 16x$ 71) _____

72) $2 - 10x = (3x - 7)(x + 1)$ 72) _____

Solve the quadratic equation by the square root property.

73) $2x^2 = 50$ 73) _____

74) $(2x - 5)^2 = 121$ 74) _____

75) $5(x - 2)^2 = 15$ 75) _____

Solve the quadratic equation by completing the square.

76) $x^2 + 12x = -21$ 76) _____

77) $z^2 + 12z + 18 = 0$ 77) _____

Solve the quadratic equation using the quadratic formula.

78) $x^2 + 4x = 3$ 78) _____

79) $2x^2 + 12x + 5 = 0$ 79) _____

Compute the discriminant. Then determine the number and type of solutions for the given equation.

80) $x^2 + 5x + 4 = 0$

80) _____

81) $x^2 + 6x + 9 = 0$

81) _____

82) $2x^2 = -2x - 5$

82) _____

Solve the radical equation, and check all proposed solutions.

83) $\sqrt{4x - 3} = 3$

83) _____

84) $x - \sqrt{3x - 2} = 4$

84) _____

85) $\sqrt{x - 3} = x - 5$

85) _____

Solve the problem.

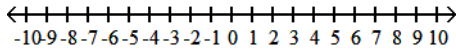
86) For a culture of 80,000 bacteria of a certain strain, the number of bacteria N that will survive x hours is modeled by the formula $N = 8000\sqrt{100 - x}$. After how many hours will 16,000 bacteria survive?

86) _____

Express the interval in set-builder notation and graph the interval on a number line.

87) $(-\infty, 2.5]$

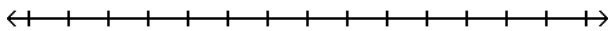
87) _____



Solve the linear inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

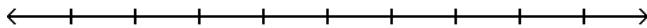
88) $-15x + 5 \leq -5(2x - 5)$

88) _____



89) $\frac{2}{3} - \frac{8}{9}x < 2$

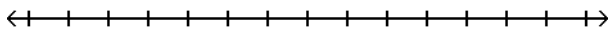
89) _____



Solve the compound inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

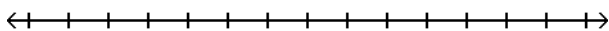
90) $-23 \leq -3x - 2 \leq -8$

90) _____



91) $2 \leq 3x - 4 \leq 17$

91) _____



Solve the problem.

92) The formula for converting Fahrenheit temperature, F , to Celsius temperature, C , is

92) _____

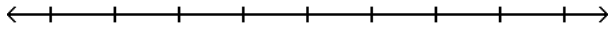
$$C = \frac{5}{9}(F - 32).$$

If Celsius temperature ranges from 50° to 100° , inclusive, what is the range for the Fahrenheit temperature?

Solve the absolute value inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

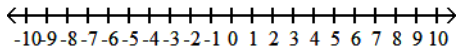
93) $|x - 7| - 6 \leq 1$

93) _____



94) $\left| \frac{3y + 12}{4} \right| < 3$

94) _____



Evaluate the function at the given value of the independent variable and simplify.

95) $f(x) = \sqrt{x + 18}$; $f(-2)$

95) _____

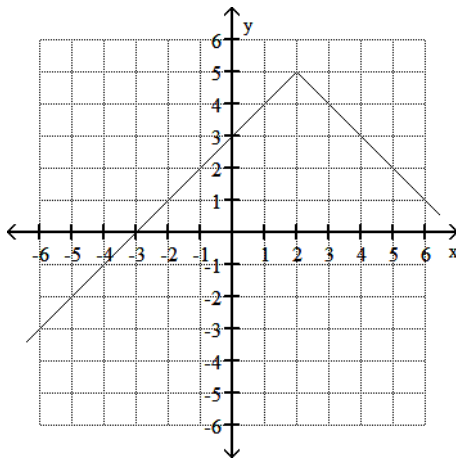
96) $f(x) = \frac{x^2 + 5}{x^3 + 3x}$; $f(2)$

96) _____

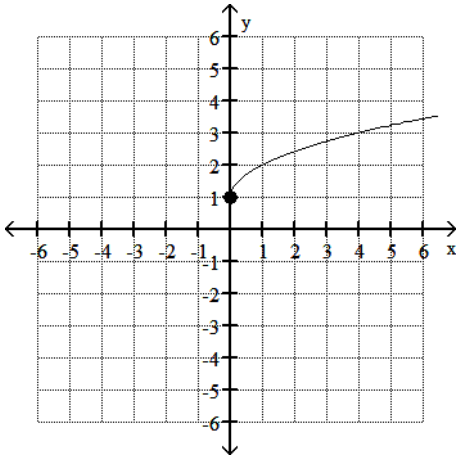
Use the graph to determine the function's domain and range.

97)

97) _____



98)



98) _____

Use the given conditions to write an equation for the line in point-slope form.

99) Slope = $\frac{1}{2}$, passing through (7, 6)

99) _____

100) Passing through (7, 2) and (4, 3)

100) _____

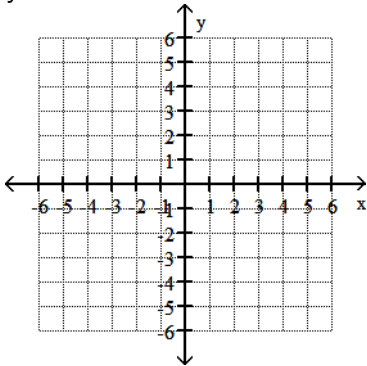
101) Passing through (1, -7) with x-intercept = -1

101) _____

Graph the line whose equation is given.

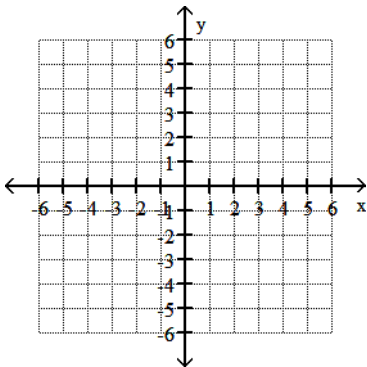
102) $y = -2x - 2$

102) _____



103) $y = -\frac{2}{5}x - 2$

103) _____



Determine the slope and the y-intercept of the graph of the equation.

104) $y - 6 = 0$

104) _____

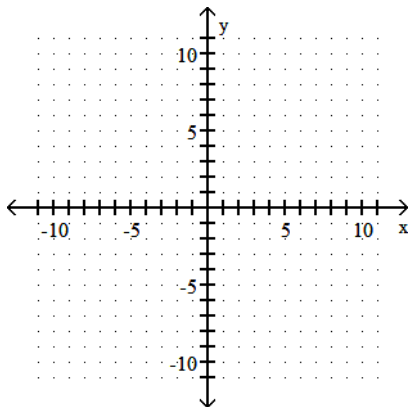
105) $x + y - 7 = 0$

105) _____

Graph the linear function by plotting the x- and y-intercepts.

106) $5x - 25y - 25 = 0$

106) _____



Use the given conditions to write an equation for the line in the indicated form.

107) Passing through (4, 3) and perpendicular to the line whose equation is $y = 9x + 7$;
point-slope form

107) _____

108) Passing through (2, -1) and parallel to the line whose equation is $y = -2x + 3$;
point-slope form

108) _____

Given functions f and g, perform the indicated operations.

109) $f(x) = 9x - 9$, $g(x) = 4x - 2$
Find $f - g$.

109) _____

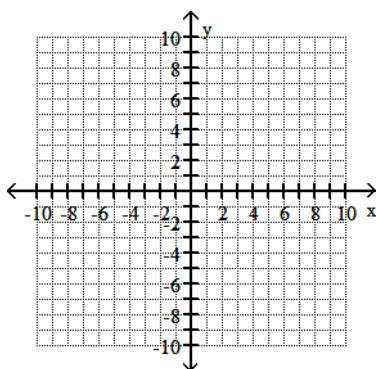
110) $f(x) = 6x^2 - 7x$, $g(x) = x^2 - 2x - 35$
Find $\frac{f}{g}$.

110) _____

Begin by graphing the standard quadratic function $f(x) = x^2$. Then use transformations of this graph to graph the given function.

111) $g(x) = x^2 + 2$

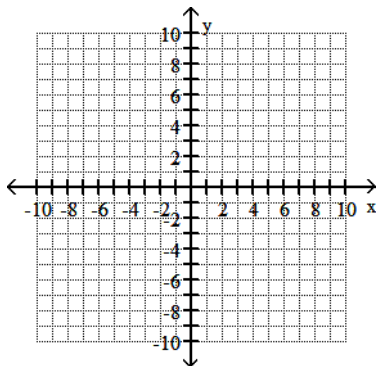
111) _____



Begin by graphing the standard square root function $f(x) = \sqrt{x}$. Then use transformations of this graph to graph the given function.

112) $g(x) = \sqrt{x} - 2$

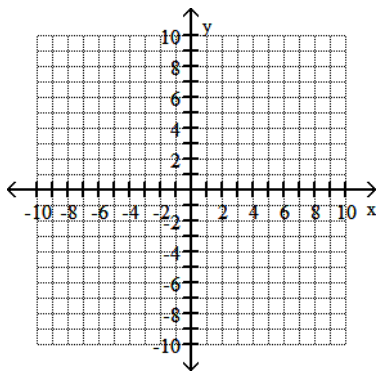
112) _____



Begin by graphing the standard absolute value function $f(x) = |x|$. Then use transformations of this graph to graph the given function.

113) $g(x) = |x| + 2$

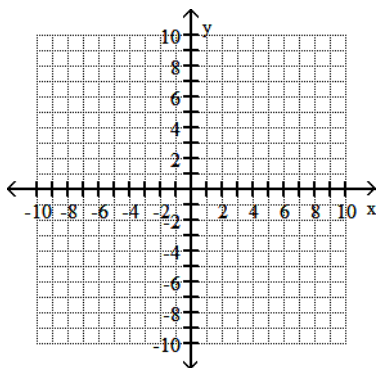
113) _____



Begin by graphing the standard function $f(x) = x^3$. Then use transformations of this graph to graph the given function.

114) $g(x) = x^3 - 2$

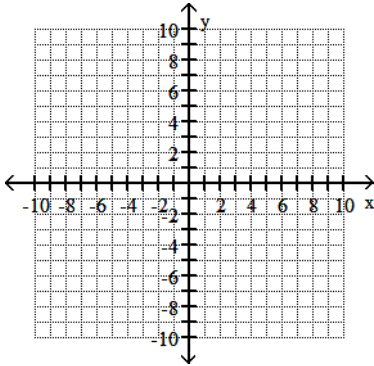
114) _____



Begin by graphing the standard square root function $f(x) = \sqrt{x}$. Then use transformations of this graph to graph the given function.

115) $h(x) = \sqrt{x + 1}$

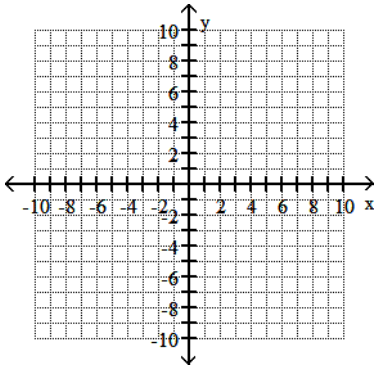
115) _____



Begin by graphing the standard absolute value function $f(x) = |x|$. Then use transformations of this graph to graph the given function.

116) $h(x) = |x + 4| + 4$

116) _____



Find the distance between the pair of points.

117) $(-4, -2)$ and $(-8, \quad)$

117) _____

Write the equation in its equivalent exponential form.

118) $\log_6 216 = x$

118) _____

119) $\log_b 16 = 2$

119) _____

Write the equation in its equivalent logarithmic form.

120) $3^{-2} = \frac{1}{9}$

120) _____

121) $5^3 = x$

121) _____

Evaluate the expression without using a calculator.

122) $\log_9 \sqrt{9}$

122) _____

123) $\log_3 \frac{1}{9}$

123) _____

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

124) $\log_5 (7 \cdot 11)$

124) _____

125) $\log_3 (9x)$

125) _____

126) $\log_3 \left(\frac{7}{13} \right)$

126) _____

Solve the equation. Give an exact solution.

127) $7^{4x} = 3.9$

127) _____

Solve the equation. Give an approximate solution to four decimal places.

128) $4^x + 8 = 7$

128) _____

129) $2^x + 8 = 5$

129) _____

Solve the equation. Give an exact solution.

130) $2^x + 7 = 6$

130) _____

Solve the equation.

131) $\log 4x = \log 5 + \log (x - 3)$

131) _____

132) $\log_2 x = 5$

132) _____

Solve the system of equations.

133)
$$\begin{cases} 2x + 20y = -144 \\ 11x + 4y = 56 \end{cases}$$

133) _____

134)
$$\begin{cases} 3x + 5y = -9 \\ -5x - 4y = 2 \end{cases}$$

134) _____

Write in terms of i.

135) $\sqrt{-270}$

135) _____

136) $\sqrt{-216}$

136) _____

Multiply or divide.

137) $\sqrt{3} \cdot \sqrt{-27}$

137) _____

138) $\frac{\sqrt{25}}{\sqrt{-2}}$

138) _____

139) $\frac{\sqrt{-40}}{\sqrt{-5}}$

139) _____

Perform the indicated operation. Write the result in the form $a + bi$.

140) $(3 - 6i) + (7 + 2i)$

140) _____

141) $(2 - 9i) + (4 + 4i)$

141) _____

142) $(5i)(14i)$

142) _____

143) $4i(9 - 7i)$

143) _____

144) $(\sqrt{8} + 2i)(\sqrt{8} - 2i)$

144) _____

145) $(8 + 9i)^2$

145) _____

146) $\frac{7}{3i}$

146) _____

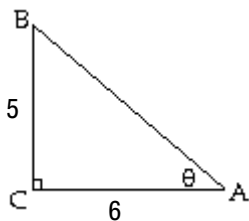
147) $\frac{9}{4 + 3i}$

147) _____

Use the Pythagorean Theorem to find the length of the missing side. Then find the indicated trigonometric function of the given angle. Give an exact answer with a rational denominator.

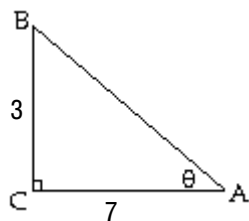
148) Find $\sin \theta$.

148) _____

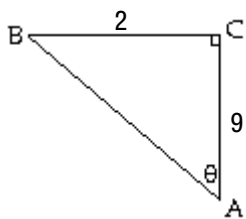


149) Find $\cos \theta$.

149) _____



150) Find $\tan \theta$.



150) _____

Answer Key

Testname: PRE-CALCULUS SUMMER MATH PACKET 2022

- 1) 15°C
- 2) 534 ft
- 3) 0
- 4) $-12x + 46$
- 5) $\frac{1}{3}$
- 6) $\frac{y}{x^4}$
- 7) $100x^9y^3$
- 8) $\frac{-125x^3}{y^3}$
- 9) $\frac{3y^9}{x^4}$
- 10) $\frac{x^{16}z^{18}}{9y^{12}}$
- 11) 5.7×10^2
- 12) 3.12×10^{-9}
- 13) $\$1.8 \times 10^{10}$
- 14) 85 miles per hour
- 15) $14\sqrt{3} + 12$
- 16) $-41\sqrt{3}x$
- 17) 108
- 18) 1
- 19) $\frac{108}{31}$
- 20) $\frac{4\sqrt{7}}{7}$
- 21) $\frac{45 + 5\sqrt{7}}{74}$
- 22) $\frac{\sqrt{39} - 3\sqrt{3}}{4}$
- 23) $\sqrt{11} - \sqrt{6}$
- 24) $6\sqrt[3]{7}$
- 25) $10\sqrt[3]{5}$
- 26) $-2y\sqrt[3]{2x}$
- 27) 16
- 28) $\frac{1}{343}$
- 29) $14x^{11/12}$
- 30) $7x^2y^2$
- 31) 1.30 hours

Answer Key

Testname: PRE-CALCULUS SUMMER MATH PACKET 2022

32) $-5x^8 - 3x^7 + 13x^6 - 1$

33) $8x^2 + 7x + 9$

34) $x^3 - 7x^2 - 47x + 33$

35) $30x^4 + 19x^2 - 5$

36) $25x^4 - 60x^2 + 36$

37) $81x^3 - 90x^2 + 21x$

38) $5x + 17$

39) $(x - 4)(x^2 - 5)$

40) $(x - 4)(5x^2 + 9)$

41) $(x + 8)(x - 9)$

42) $(5x + 6)(x + 2)$

43) $(5x - 2)(3x - 2)$

44) $(4x - 3y)(2x + 3y)$

45) $(x^2 + 16)(x + 4)(x - 4)$

46) $(5x - 4)(25x^2 + 20x + 16)$

47) $6x(x + 12)(x - 12)$

48) $(y + 10)(y - 10)$

49) $x \neq 6, x \neq 2$

50) $\frac{1}{3x + 5}, x \neq -\frac{5}{3}, x \neq -1$

51) $2x - 8, x \neq 7$

52) 1

53) $\frac{4(x + 4)}{x - 4}$

54) $\frac{3x^4}{35(7x + 6)}$

55) $\frac{10x - 11}{(x - 1)(x + 1)(x - 2)}$

56) $\frac{5x - 4}{x - 1}$

57) $\frac{16}{x + 7}$

58) $\frac{6 + x}{6 - x}$

59) $\frac{x - 2}{5}$

60) $8x + 4y$

61) $\left\{-\frac{224}{17}\right\}$

62) $0; \left\{-\frac{25}{54}\right\}$

63) $0; \left\{-\frac{27}{14}\right\}$

64) $\{2\}$

65) 139 units

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66) $c = \frac{ab}{a+b}$

67) $t = \frac{A - P}{Pr}$

68) $\{-5, 9\}$

69) $\{9, -3\}$

70) $\{-11, 7\}$

71) $\left\{0, \frac{1}{4}\right\}$

72) $\{-3, 1\}$

73) $\{-5, 5\}$

74) $\{-3, 8\}$

75) $\{2 - \sqrt{3}, 2 + \sqrt{3}\}$

76) $\{-6 - \sqrt{15}, -6 + \sqrt{15}\}$

77) $\{-6 + 3\sqrt{2}, -6 - 3\sqrt{2}\}$

78) $\{-2 - \sqrt{7}, -2 + \sqrt{7}\}$

79) $\left\{\frac{-6 - \sqrt{26}}{2}, \frac{-6 + \sqrt{26}}{2}\right\}$

80) 9; two unequal real solutions

81) 0; one real solution

82) -36; no real solution

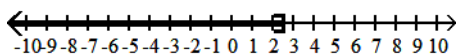
83) $\{3\}$

84) $\{9\}$

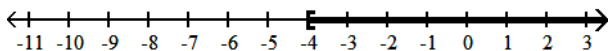
85) $\{7\}$

86) 96 hr

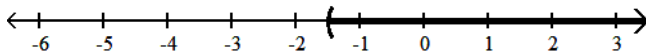
87) $\{x \mid x \leq 2.5\}$



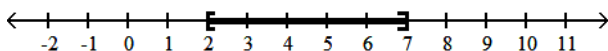
88) $[-4, \infty)$



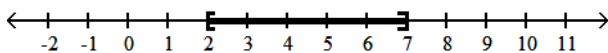
89) $\left[-\frac{3}{2}, \infty\right)$



90) $[2, 7]$



91) $[2, 7]$

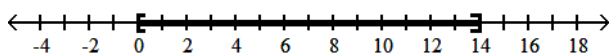


92) $[\quad ^\circ\text{F}, 212^\circ\text{F}]$

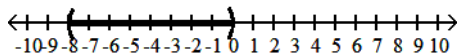
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93) $[0, 14]$



94) $(-8, 0)$



95) 4

96) $\frac{9}{14}$

97) domain: $(-\infty, \infty)$

range: $(-\infty, 5]$

98) domain: $[0, \infty)$

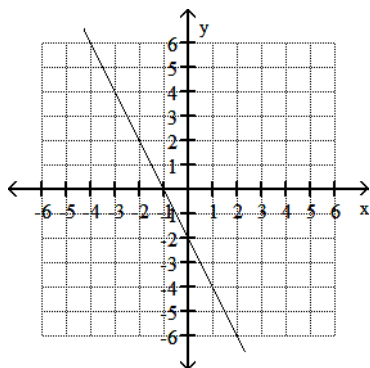
range: $[1, \infty)$

99) $y - 6 = (x - 7)$

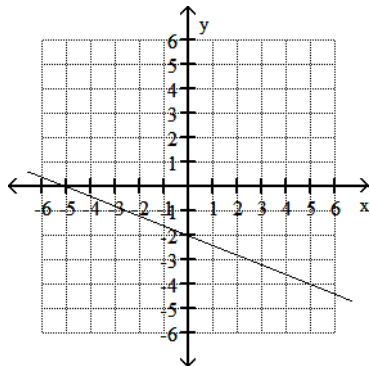
100) $y - 2 = -\frac{1}{3}(x - 7)$ or $y - 3 = -\frac{1}{3}(x - 4)$

101) $y + 7 = -\frac{7}{2}(x - 1)$ or $y = -\frac{7}{2}(x + 1)$

102)



103)



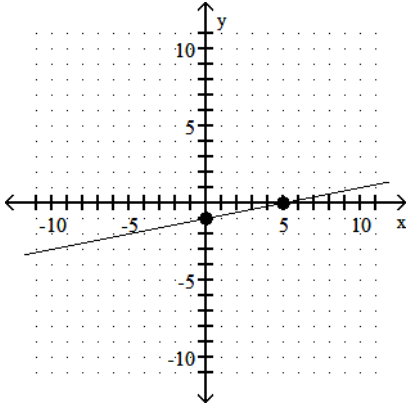
104) $m = 0; (0,)$

105) $m = -1; (0,)$

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106) intercepts: (0, -1), (5, 0)



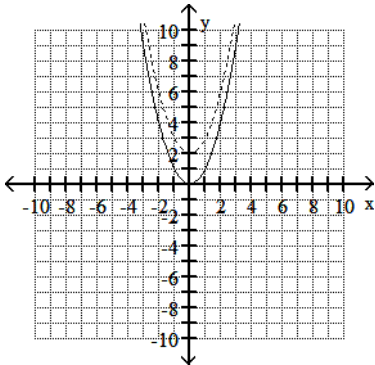
107) $y - 3 = -\frac{1}{9}(x - 4)$

108) $y + 1 = -2(x - 2)$

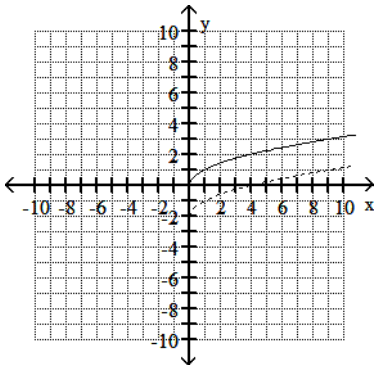
109) $x - 7$

110) $\frac{6x^2 - 7x}{x^2 - 2x - 35}$

111)



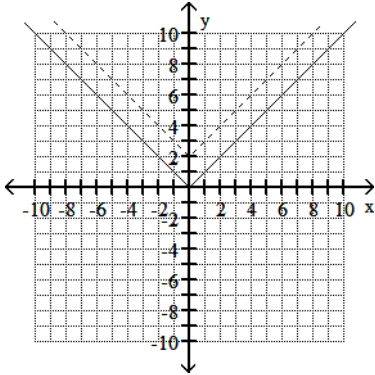
112)



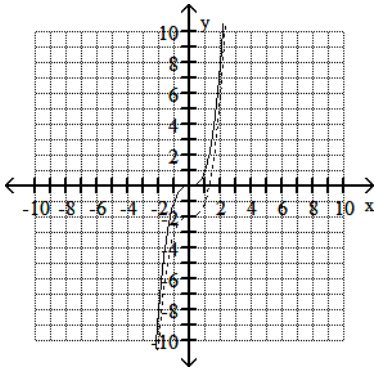
Answer Key

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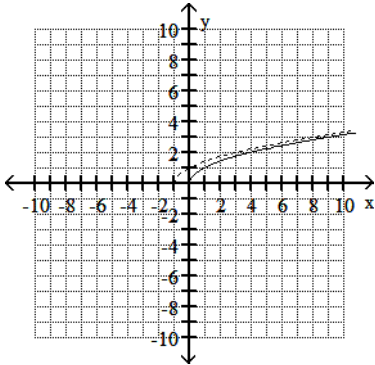
113)



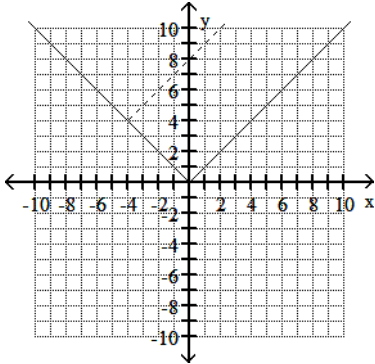
114)



115)



116)



117) 5

118) $6^x = 216$

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119) $b^2 = 16$

120) $\log_3 \frac{1}{9} = -2$

121) $\log_5 x = 3$

122) $\frac{1}{2}$

123) -2

124) $\log_5 7 + \log_5 11$

125) $2 + \log_3 x$

126) $\log_3 7 - \log_3 13$

127) $\frac{\log 3.9}{4 \log 7}$

128) -6.5963

129) -5.6781

130) $\frac{\log 6}{\log 2} - 7$

131) 15

132) 32

133) $(8, -8)$

134) $(2, -3)$

135) $3i\sqrt{30}$

136) $6i\sqrt{6}$

137) $9i$

138) $\frac{-5i\sqrt{2}}{2}$

139) $2\sqrt{2}$

140) $10 - 4i$

141) $6 - 5i$

142) $-70 + 0i$

143) $28 + 36i$

144) $12 + 0i$

145) $-17 + 144i$

146) $0 - \frac{7}{3}i$

147) $\frac{36}{25} - \frac{27}{25}i$

148) $\frac{5\sqrt{61}}{61}$

149) $\frac{7\sqrt{58}}{58}$

150) $\frac{2}{9}$