

Precalculus with Trigonometry Honors – Summer Packet

Welcome to Precalculus with Trigonometry Honors! We look forward to guiding you through an informative and exciting year en route to Calculus! In order to be prepared for the rigor of this course, you must complete the attached assignment.

Please complete this assignment on a **separate sheet of paper** and bring it with you the first day of class. There will be a short amount of time to ask questions during the first class. You must **SHOW ALL WORK** on all problems. If this is not done, you will not receive credit. Calculators are **NOT** allowed on this assignment except to find trig values of non-special right triangles.

THE MATERIAL INCLUDED IN THIS REVIEW ASSIGNMENT IS ESSENTIAL FOR UNDERSTANDING FUNDAMENTAL CONCEPTS OF TRIGONOMETRY AND PRECALCULUS. Please understand that strategies presented in this review will be utilized extensively throughout the curriculum.

Please note that calculators are not provided for student use in this class. It is recommended that each student has a graphing calculator (TI-83, TI-83 plus, TI-84 or TI-84 plus) of his/her own.

Please use your notes from previous years, the internet, or work with other students.

We look forward to meeting you. Please contact us if you have any questions.

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Use the appropriate procedures to simplify each of the following rational expressions.

$$1. \left(\frac{x^2 + 2x - 3}{x + 2} \right) \left(\frac{x^2 + 2x}{x^2 - 1} \right)$$

$$2. \frac{3}{1-x} + \frac{5}{1+x}$$

$$3. x^4(-2x)^3(6x^0)^{-2}$$

$$4. \frac{3}{36^{\frac{1}{2}}}$$

State whether the relation is a function. Write yes or no. State the domain and range of each function.

$$5. \{(-1, 2), (3, 10), (-2, 20), (3, 11)\}$$

$$6. \{(0, 2), (13, 6), (2, 2), (3, 1)\}$$

Name all the values of x that are in the domain of the given function. Give the answer in interval notation.

$$7. f(x) = \frac{x-2}{x+4}$$

$$8. f(x) = \sqrt{x^2 - 25}$$

$$9. f(x) = \frac{x^2 + 3x - 10}{x^2 - 25}$$

For problems 10-14, use $f(x) = \frac{2}{x+4}$ and $g(x) = x^2 - 2$ to find each function.

$$10. f(-5)$$

$$11. g^{-1}(x)$$

$$12. (f - g)x$$

$$13. (fg)x$$

$$14. \frac{f}{g}(x)$$

For problems 15-16, find $(f \circ g)x$ and $(g \circ f)x$. Then decide whether the functions are inverses of each other or not. Write yes or no.

$$15. f(x) = \frac{x+5}{3}, g(x) = 3x-5$$

$$16. f(x) = 2x^2 - 5x + 1, g(x) = 2x - 3$$

State the inverse of each function. Tell whether the inverse is a function. Write yes or no.

$$17. f(x) = 3x + 7$$

$$18. f(x) = x^5$$

$$19. f(x) = x^2 + 4$$

Factoring and Solving Quadratic Equations

Factor completely:

20. $x^3 - 7x^2 + 6x$

21. $3x^2 - 75$

22. $-8x^2 + 40xy + 112y^2$

23. $x^3 - y^3$

24. $16x^2 - 24x + 9$

25. $8x^3 + 27y^3$

26. $25 + 10x + x^2$

27. $x^2 + 7x - 8$

28. $81x^2 - 169$

29. $x^4 - 13x^2 + 36$

Expand the following expressions:

30. $(2a - 3b)^2$

31. $\left(\frac{1}{3}x + \frac{2}{3}\right)^2$

Solve by factoring:

32. $x^2 - 49 = 0$

33. $6x^2 - 10x = 4$

34. $5x^2 - 37x + 14 = 0$

35. $90x^4 = 10x^2$

Solve using the quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (You will be required to memorize this formula.)

36. $3x^2 + x - 1 = 0$

37. $5x^2 + 8 = -12x$

Solve by completing the square:

38. $x^2 - 2x - 5 = 0$

39. $x^2 - 4x + 2 = 0$

Simplify:

40. $(5 - 3i)(2 + 4i)$

41. $\frac{(4 - 5i)}{(9 + i)}$

42. $\log_2 \left(\frac{2x^2y^{-3}}{y^3x^{-2}} \right)$

43. $\log_3 \left(\frac{27\sqrt{x}}{243\sqrt{x^3}} \right)$

Solve for x . Leave your answer in terms of π .

$$44. \pi = \frac{5\pi}{6} \div x$$

$$45. \frac{180}{\pi} = \frac{330}{x}$$

Solve each equation algebraically:

$$46. \frac{x+1}{3} + \frac{x+2}{7} = 5$$

$$47. \sqrt{15-2x} = x$$

$$48. |1-4t| = 5$$

$$49. 2(x-3)^2 = 8$$

$$50. \log_3 x = 4$$

$$51. 2^{2x} = 8^{x-1}$$

$$52. \log(-4-x) + \log 3 = \log(2-x)$$

$$53. 3\log_2 x - 2\log_2(5x) = 2$$

Solve each inequality algebraically. Use interval notation for the solution. Graph the solution set on a number line.

$$54. |1-4x| \geq 5$$

$$55. x^2 + 3x - 4 < 0$$

Find an equation for the line with the given properties. Express your answer using slope-intercept form. Graph. (Blank graphs are at the end of the packet.)

$$56. x\text{-intercept: } (2,0) \quad y\text{-intercept: } (0,-1)$$

$$57. 2x - 3y = 6$$

Graph the following functions and give the domain and range in interval notation. Show all important information (vertex, asymptotes, holes, etc.) (Blank graphs are at the end of the packet.)

$$58. f(x) = |x-4| + 5$$

$$59. f(x) = \begin{cases} 2x+13 & \text{if } x \geq -5 \\ x+\frac{1}{2} & \text{if } x < -5 \end{cases}$$

$$60. f(x) = \frac{2x+3}{x-1}$$

$$61. f(x) = 3^{x-1} + 4$$

$$62. f(x) = -\sqrt{x+2} - 1$$

$$63. f(x) = -(x+2)^2 + 3$$

$$64. f(x) = (x-3)^3 - 1$$

$$65. f(x) = \left(\frac{1}{2}\right)^x$$

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

$$67. f(x) = \ln x$$

$$68. \text{ Find the Quotient using Long Division: } \frac{4x^3 + 8x^2 - 5x + 7}{2x+1}$$

$$69. \text{ Find the Quotient using Synthetic Division: } \frac{x^3 - 4x^2 + 2x - 6}{x+3}$$

Domain & Range Review

Domain: The possible x-values of a function

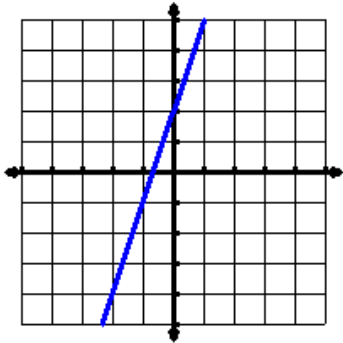
Range: The possible y-values of a function

Give the domain and range of the following.

Example:

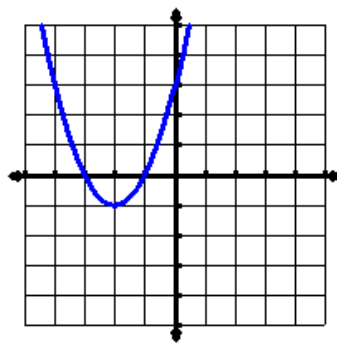
Domain: All real numbers

Range: All real numbers



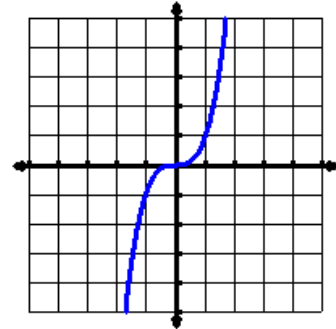
70. D: _____

R: _____



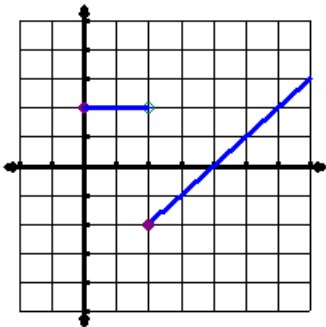
71. D: _____

R: _____



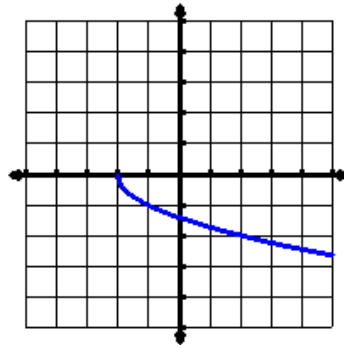
72. D: _____

R: _____



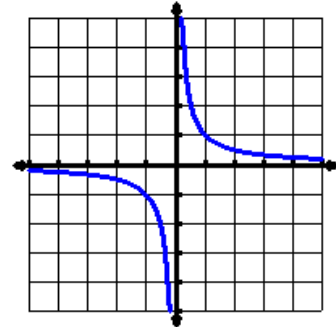
73. D: _____

R: _____



74. D: _____

R: _____



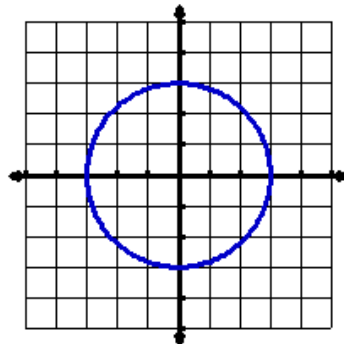
75. D: _____

R: _____

$$f(x) = \frac{5}{x-1}$$

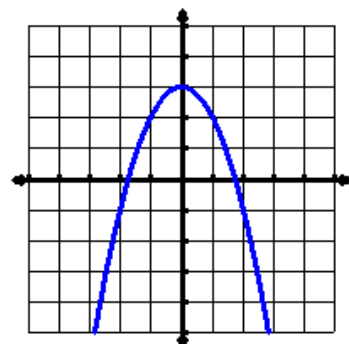
76. D: _____

R: _____



77. D: _____

R: _____



Simplify. Rationalize where appropriate.

78. $\sqrt{45}$

79. $\sqrt{24}$

80. $\sqrt{\frac{1}{2}}$

81. $-2\sqrt{72}$

82. $4\sqrt{27} + 3\sqrt{12}$

83. $5\sqrt{11} \cdot 6\sqrt{4}$

84. $2\sqrt{500} + 5\sqrt{20}$

85. $6\sqrt{-8} - 3\sqrt{-18}$

86. $(\sqrt{101})^2$

87. $(5\sqrt{8})^2$

88. $\sqrt{f^7 g^3 h}$

89. $\sqrt{54m^9 n^6}$

90. $\frac{2}{\sqrt{20}}$

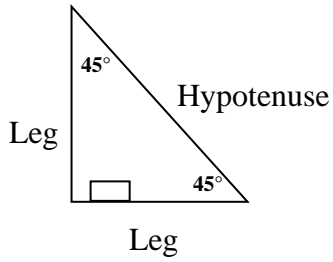
91. $\frac{4\sqrt{2}}{5} - \frac{3}{\sqrt{2}}$

92. $\frac{4}{2 + \sqrt{7}}$

93. $\frac{5}{3 - \sqrt{2}}$

94. $\frac{\sqrt{3} - 1}{\sqrt{3} + 1}$

45°–45°–90° Triangles

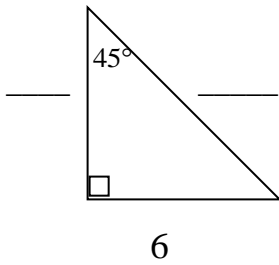


The ratio of leg-leg-hypotenuse is $1:1:\sqrt{2}$

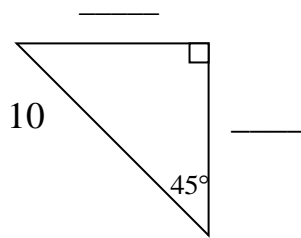
Hypotenuse = Leg $\cdot \sqrt{2}$

Find the missing sides of the triangles. Each triangle measures 45°–45°–90°. Leave answers as simplified radicals.

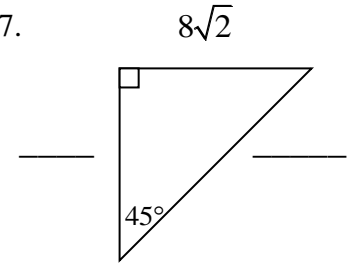
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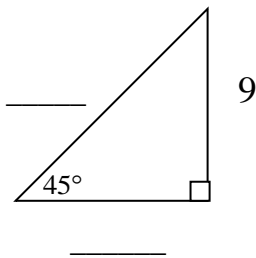
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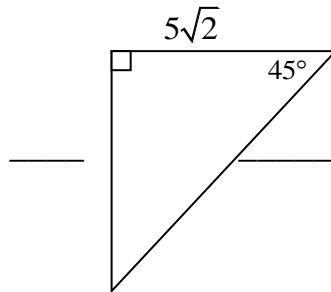
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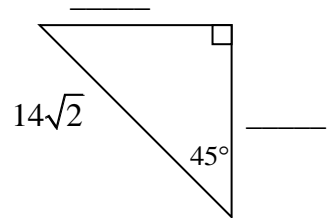
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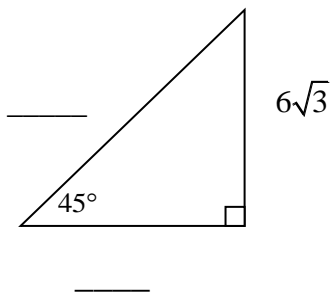
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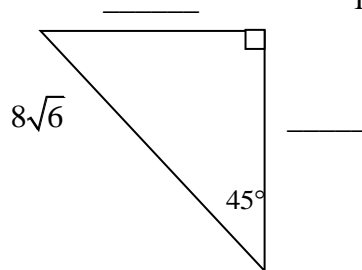
100.



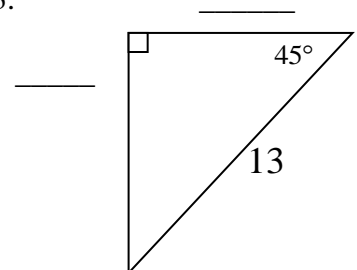
101.



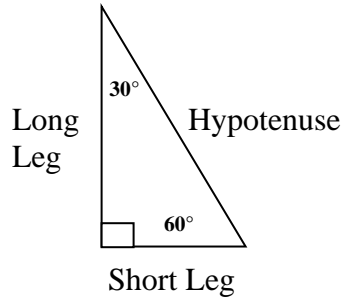
102.



103.



30° – 60° – 90° Triangles



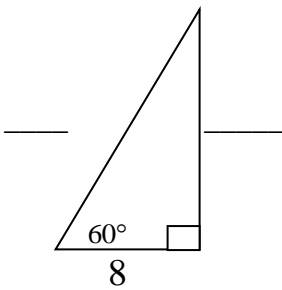
The ratio of short leg-long leg-hypotenuse is $1 : \sqrt{3} : 2$

Hypotenuse = Twice the Short Leg

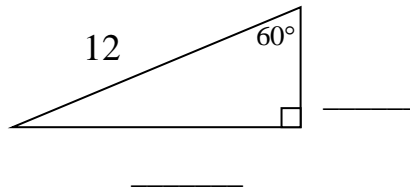
Long Leg = Short Leg $\bullet \sqrt{3}$

Find the missing sides of the triangles. Each triangle measures 30° – 60° – 90°. Leave answers in simplified radical form.

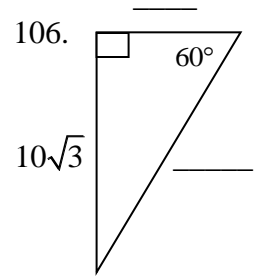
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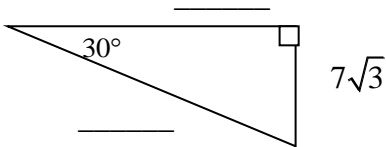
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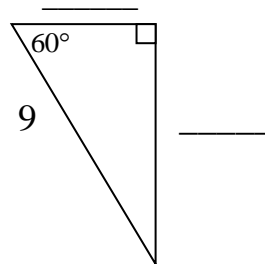
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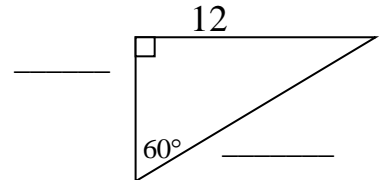
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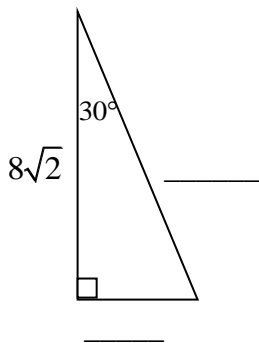
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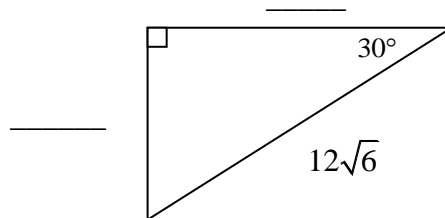
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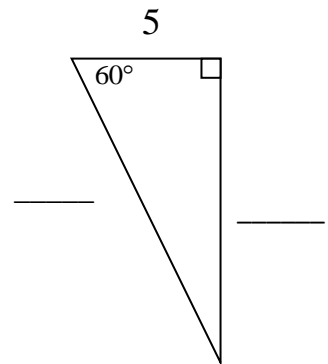
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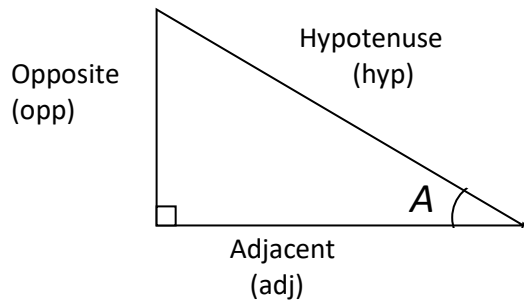
111.



112.



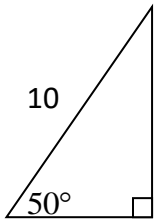
Basic Trigonometry Review: SOH-CAH-TOA



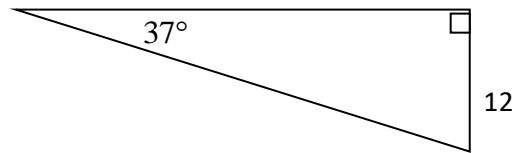
$$\sin A = \frac{opp}{hyp}$$
$$\cos A = \frac{adj}{hyp}$$
$$\tan A = \frac{opp}{adj}$$

Find the length of the two missing sides of the triangle. You **MAY** use a calculator for these problems. Round to 3 decimal places.

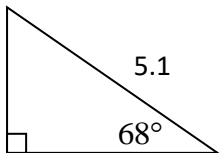
113.



114.



115.



116.

