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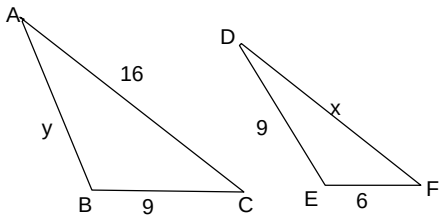
Summer Packet for Students entering Trig/Analysis
Review problems from Geometry: Show your work!

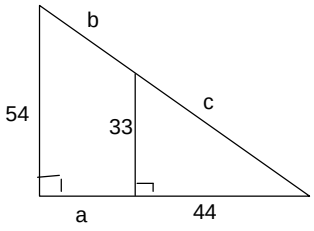
1. Twice the complement of angle *A* is 35° less than the supplement of angle *A*. Find angle *A*.

2. The lengths of the sides of a triangle are 9cm, 13 cm and 15 cm. Is this triangle acute, right or obtuse?

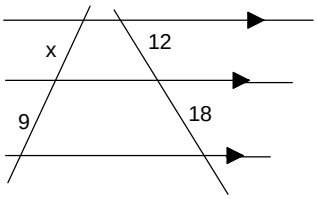
3. Given that triangle *ABC* and triangle *DEF* are similar. Solve for x and y.



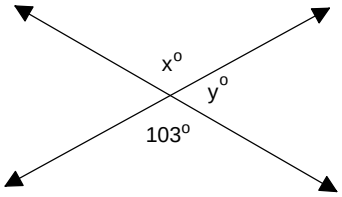
4. Find *a*, *b*, and *c*.



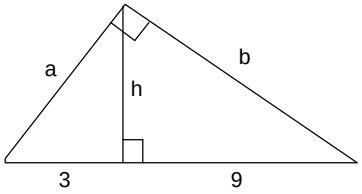
5. Find *x*.



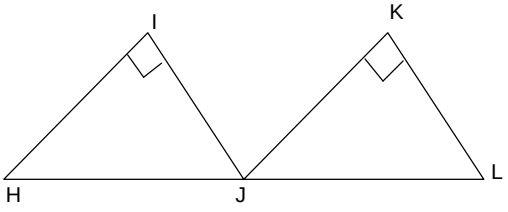
6. Find *x* and *y*.



7. Find *a*, *b*, and *h*.



8. Which congruency principle would you use to prove that $\Delta HIJ \cong \Delta JKL$ if $HI \cong JK$ and $IJ \cong KL$? (Recall: SSS, SAS, ASA, AAS, HL)



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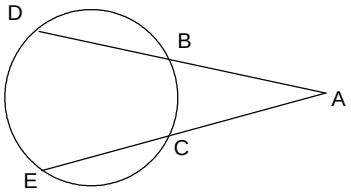
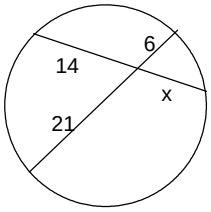
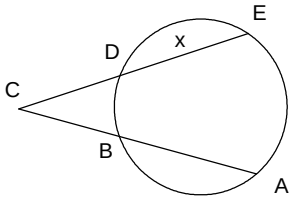
9. If m $\widehat{DE}$ = 122 and m $\widehat{BC}$ = 78, find m<A.



10. Solve for x:

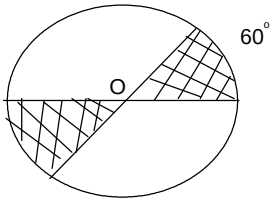


11. Find the value of x if AB = 24, BC = 10, CD =11.

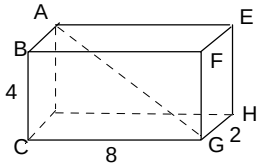


12. An equilateral triangle has a perimeter of $24\sqrt{3}\ m$ and an area of $48\sqrt{3}\ m^2$. Find the altitude of the triangle.

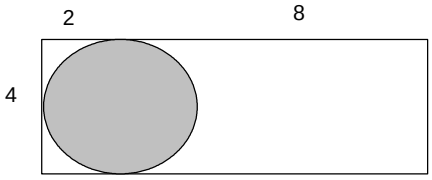
13. In circle O, the radius is 3 meters. Find the area of the shaded sectors.



14. Find the length of the diagonal AG in the solid right rectangular prism shown below:



15. Find the area that is UNSHADED, if the circle is tangent to 3 sides of the rectangle:



16. Skip this problem. This box is intentionally left blank.

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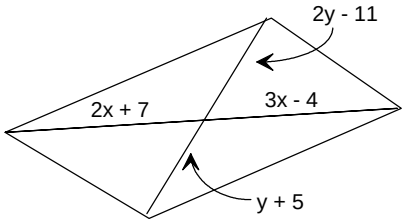
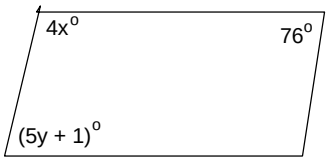
17. Find the values of x and y that will make this quadrilateral a parallelogram:



18. What values must x and y have to make this quadrilateral a parallelogram?



19. What specific quadrilateral has diagonals that bisect each other perpendicularly?

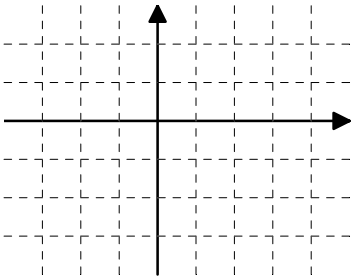
20. Write the following sentence as an "if...then..." conditional; then write its converse and contrapositive sentences:

All squares are rectangles.

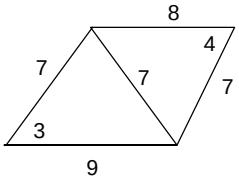
Identify which of the three sentences are true, and which are false.

21. Calculate the midpoint, slope and length of the segment determined by the points (-3,-4) and (5,2).

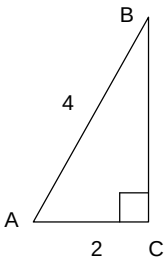
22. Graph the linear equation $y = 2x - 3$



23. Which is larger: <3 or <4 ?



24. Calculate the length of BC in simplest radical form, then use this triangle to express the fractions in simplest form:



BC=

SIN A =

COS A =

TAN A =

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Simplify the following algebraic expressions:

Examples:

Ex: $\sqrt{12\sqrt{3}}$ =

$12^{\frac{1}{2}}(3^{\frac{1}{2}})^{\frac{1}{2}} = 4^{\frac{1}{2}}3^{\frac{1}{2}}3^{\frac{1}{4}} = 2(3)^{\frac{3}{4}}$

Ex: $\sqrt{-3}\sqrt{-3} + 2i^3 - 5i + 6i^4 =$

$\sqrt{3}\,i\sqrt{3}\,i + 2(-i) - 5i + 6(+1) =$

$\sqrt{9}\,i^2 - 2i - 5i + 6 = -3 - 7i + 6 = 3 - 7i$

$Ex: \dfrac{\frac{1}{x} - \frac{2}{y}}{\frac{1}{x} + 3} =$

$\dfrac{\frac{y}{xy} - \frac{2x}{xy}}{\frac{1}{x} + \frac{3x}{x}} = \dfrac{\frac{y-2x}{xy}}{\frac{1+3x}{x}} = \left(\frac{y-2x}{xy}\right)\left(\frac{x}{1+3x}\right) = \frac{y-2x}{y(1+3x)}$

Ex: $25^{\frac{-1}{2}}x^{-2}y^0 = \frac{1}{\sqrt{25}}\frac{1}{x^2}(1) = \frac{1}{5x^2}$

25.

$2i^2 + 4i^3 - 3i^8 - 4$

26.

$$\frac{\sqrt[3]{x^3y^6}\,xy^{-2}}{\sqrt{x^4y^6}\,(xy)^4}$$

27.

$$\frac{e^{-2} + g^2e^{-3}}{e^{-2}g^5}$$

28.

$$\frac{-3 + 3i - i^3}{2 - i}$$

29.

$$\frac{2 + 2\sqrt{3}}{2\sqrt{3} - 4}$$

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30. $\sqrt{20\sqrt{5}}$	31. $4\sqrt{\frac{7}{5}} - 4\sqrt{\frac{5}{7}} + 3\sqrt{315}$
32. $\frac{-x+4}{x+3} + \frac{4x-3}{3-x}$	33. $\frac{a}{hd} - d + \frac{a^4}{h^4}$
34. $\dfrac{\frac{e^2 s}{u^4} - s^2}{\frac{e}{u^3} - \frac{7}{u^4}}$	35. $-\dfrac{1}{81^{-1/2}}$
36. $(\sqrt{2} - \sqrt{7})(\sqrt{2} + \sqrt{7})$	37. $\sqrt{-2}\sqrt{-3} - \sqrt{-25} - \sqrt{-5}\sqrt{-5} + 4i^7$
38. $2i^2 + 4i^3 - 3i^8 - 4$	39. $\dfrac{u}{v} + \dfrac{2}{5+\frac{4u}{v}}$

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Use these reminders to convert measurements:

Unit multipliers:

1 km = 1000 meters
1 m = 100 cm
1 in = 2.54 cm
1 ft = 12 inches
1 yd = 3 feet
1 min = 60 sec
1 hr = 60 min
1 mile = 5280 ft

Example: Change 30 mph to cm/sec

$$\frac{30 miles}{1 hr}\cdot\frac{1 hr}{60\,\text{min}}\cdot\frac{1\,\text{min}}{60\,\text{sec}}\cdot\frac{5280 ft}{1 mile}\cdot\frac{12 in}{1 ft}\cdot\frac{2.54 cm}{1 in}$$

$$= \frac{(30)(5280)(12)(2.54)}{(60)(60)}\frac{cm}{\text{sec}}$$

Converting Rectangular to Polar:

Example: 3R - 4U = ?

$(3)^2+(-4)^2 = r^2$ r = 5

$\tan\theta = \frac{-4}{3}$ $\theta = arc\tan(\frac{-4}{3})$ $\theta = -53^o$

3R - 4U = 5/-53° or 5 /307°

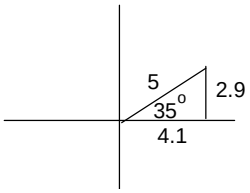
Converting Polar to Rectangular:

Example: 5 /135° = ?

R: 5 cos35° = 4.1

U: 5 sin35° = 2.9

Ans: 4.1R + 2.9U



40. Convert 78 meters per hour to feet per second

41 Convert 7R + 3U to polar form

42. Convert 6 feet per sec to miles per hour

43. Convert -2R + 6U to polar form

44. Convert 42 cm per min to inches per sec

45. Convert 6 /200° to rectangular form

46.Convert 4 /150° to rectangular form

47. Convert 8 /315° to rectangular form

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Write appropriate equations and solve these problems:

48. A total of 68 ducks and horses were on the ranch. If two times the number of ducks exceeded the number of horses by seven, how many of each were on the ranch?

49. A survey indicated that 3 out of 4 doctors used brand X aspirin. If 2400 doctors were surveyed, how many used brand X?

50. In a random selection, 75% of the people preferred to travel by car rather than fly. A total of 339 people polled preferred flying. How many people were polled?

51.Kaye has $2.80 in nickels and dimes. She has three times as many dimes as nickels. How many nickels and how many dimes does she have?

52. Find three consecutive odd integers such that four times the sum of the first and second is 3 less than 7 times the third number.

53. The alloy is 35% titanium. If there are 1508 grams of other elements in the alloy, how much titanium does it contain?

54. LeAnn's test scores are 88, 100, 72 and 94. What score does she need on the next test so that her overall average score is 90?

55. Twice the number of reds exceeded 3 times the number of blues by 8. The ratio of reds to the sum of reds and blues was 5 to 7. How many were red? How many were blue?

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Study the examples and then solve the following equations:

Ex: Using factoring on $x^2 - 5x = -6$

(Set equation to zero, write polynomial in order)

$x^2 - 5x + 6 = 0 \ldots. \Rightarrow \ldots (x-2)(x-3) = 0$

x = 2 or x = 3

Ex.Completing the square $2x^2 - 8x - 10 = 0$

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

$2(x^2 - 4x + 4) = 10 + 8$

$2(x-2)^2 = 18$ $(x-2)^2 = 9$ $x-2 = \pm 3$ **x=5,-1**

Ex: Solving radical equations:

(Isolate radical on one side; square both sides)

$\sqrt{2x-3} - \sqrt{1} = 4$

$\sqrt{2x-3} = 5$; 2x-3=25; 2x=28; **x=14**

Ex.: Fractional equations:

$\frac{5}{3} - \frac{2}{x-4} = \frac{1}{2}$ Multiply byLCD: (3)(2)(x-4)

$\frac{5(3)(2)(x-4)}{3} - \frac{2(3)(2)(x-4)}{(x-4)} = \frac{1(3)(2)(x-4)}{2}$

Reduce to: $5(2)(x-4) - 2(3)(2) = 3(x-4)$

Distribute: 10x - 40 - 12 = 3x - 12

7x =40

$x = \frac{40}{7}$

Ex. Solve linear systems by elimination/substitution:

x - 3y = -6 $\Rightarrow$ (-2)[x-3y =-6]

2x + 5y = 21

Add equations together to

-2x + 6y = 12 eliminate one variable

2x + 5y = 21 $\Rightarrow 11y = 33 \Rightarrow y = 3$

Substitute y = 3 into original equation to obtain x = 3

Ans: **(3,3)**

56. Solve by factoring:

$x^2 - 7 = 9$

57. Solve by factoring:

$3x^2 - x = 4$

58. Solve by factoring:

$2x = 5 - 3x^2$

59. Solve by completing the square:

$2x + 7 = 3x^2$

60. Solve by completing the square:

$2x^2 = -x - 5$

61. Solve by completing the square:

$2x - x^2 = 1$

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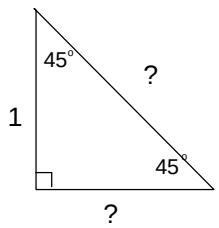
62. Solve for x: $\sqrt{3x+1} + \sqrt{9} = 7$	63. Solve for x: $\sqrt{x-27} + \sqrt{x} = 9$
64. Solve for x: $\sqrt{x-7} + \sqrt{x} = 7$	65.Solve this linear system: $N_R + N_B = 70$ $2N_R + 3N_B = 190$
66. Solve this system : $N_W + 2N_G = 7$ $3N_W - 5N_G = 10$	67. $2\frac{1}{4}X - 3\frac{1}{2} = -\frac{1}{16}$
68. $\frac{4}{7} + \frac{3}{x+3} = \frac{5}{3}$	69. $\frac{1}{x-7} + \frac{1}{4} = \frac{1}{3}$

Complete the definitions of the basic trig ratios using opposite leg, adjacent leg, hypotenuse, and supply the missing sides of the two special right triangles

70. *SIN* θ = *ratio* of _____

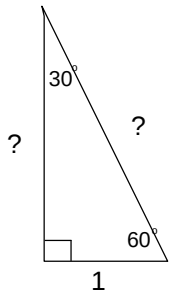
71. *COS* θ = *ratio* of _____

72. *TAN* θ = *ratio* of _____



73. Leg = ___

74. Hypotenuse= ___



75. Leg = _____

76. Hypotenuse = ____

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Draw a diagram,and set up an appropriate trig ratio to solve the following problems. Make sure that your scientific calculator is set to DEGREE MODE!

77. An airplane is flying at an altitude of 5000 feet above the ground. The pilot sights an object on the ground at an angle of depression of 28^o. What is the slant range from the airplane to the object on the ground? (round answer to nearest foot)

78. An isosceles triangle has base angles of 70^o and a base of 10 cm. Calculate the height of the triangle, and then determine the area of the triangle to the nearest cm^2.

79. A right triangle has legs of 10 cm and 12 cm. Determine the degree measure in the angle opposite the 12 cm. leg. (Give answer to nearest degree).

Analytic Geometry

Write equations for the lines or circles described:

Linear equations: y = mx + b (slope-intercept style)

$(y - y_1) = m(x - x_1)$ (Point-slope form)

Circular equations: $(x - a)^2 + (y - b)^2 = r^2$ where center is (a,b), radius = r

80. Write an equation of the line having slope 2 and y intercept (0, -3).

81. Write an equation of the line passing through the points (2,3) and (-4,5).

82. Write an equation of the line parallel to 3y - 2x - 18 = 0, passing through (1,1).

83. Write an equation of the line that passes through (1,-1) perpendicular to x+ 4y =3.

84. Write an equation of the circle centered at the origin with radius 10.

85. Write an equation of the circle centered at (2,3) with radius 4.

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Ex: Use the quadratic formula

$3x^2 - 6x = -2$

$3x^2 - 6x + 2 = 0$

$a = 3, b = -6, c = 2$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(3)(2)}}{2(3)}$$

$$x = \frac{6 \pm \sqrt{36 - 24}}{6}$$

$$x = \frac{6 \pm \sqrt{12}}{6}$$

$$x = \frac{6 \pm 2\sqrt{3}}{6} = 1 \pm \frac{\sqrt{3}}{3}$$

86. Solve using the quadratic formula
$x^2 - 8x = 6$

87. Solve using the quadratic formula
$x^2 + 5 = 7x$

88. Solve using the quadratic formula
$2x^2 + 4x + 5 = 0$

Now that you've finished, enjoy the remaining summer days 'til school begins this fall!!