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Summer Packet for Students entering Algebra 2
(Students who have successfully completed Algebra I & Geometry)

Review of Algebra I

Find the value of the variable in these linear equations. Show your work!

Ex.: $x + 5 = 12$ $x + 5 - 5 = 12 - 5$ $x = 7$	1. $85 + x = 130$	2. $2X - 5 = 11$
3. $6 + x = 21$	4. $9x = 360$	5. $-5x = 200$
6. $12 = \frac{x}{3}$	7. $-9 = \frac{x}{4}$	8. $12 = 3x + 9$
9. $18x - 2x = 660$	10. $3x - (x + 2) = 10$	11. $4x - 23 = 9x + 7$
12. $180 - x = 2(90 - x)$	13. $2(x - 5) = 3(x + 2)$	14. $(4x + 50) + (5x + 10) = 180$
15. $105 = 15x$	16. $\frac{5x}{4} = -20$	17. $\frac{2x+1}{5} + 3 = 7$
18. $2x - 3 = 5x + 9$	19. $11x = 180 + 2x$	20. $2(x + 5) + 7 = 11 - x$

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<p>Example: $y = 5 - 2x$ (1) $5x - 6y = 21$ (2)</p> <p>Substitute $5 - 2x$ for y in (2) $5x - 6(5 - 2x) = 21$</p> <p>Apply the distributive prop. $5x - 30 + 12x = 21$</p> <p>Collect similar terms; solve for x $17x = 51$; $x = 3$</p> <p>Substitute $x = 3$ into equation (1) $y = 5 - 2(3) = -1$</p> <p>Solution is (3,-1)</p>	<p>21. $y = 3x$ $5x + y = 24$</p>	<p>22. $X = 8 + 3y$ $2x - 5y = 8$</p>
<p>23. $3x + 2y = 71$ $y = 4 + 2x$</p>	<p>24. $x - 7y = 13$ $3x - 5y = 23$</p>	<p>25. $3x + y = 19$ $2x - 5y = -10$</p>
<p>26. $8x + 3y = 26$ $2x = y - 4$</p>	<p>27. $2x + 3y = 71$ $2y = x - 4$</p>	<p>28. $x = y$ $y = 8 + 3x$</p>

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Solve each system of equations by the elimination method
(addition/subtraction):

<p>Example: $3x - 2y = 4$ (1) $2x - 5y = -1$ (2)</p> <p>Multiply equation (1) by 2 And multiply equation (2) by -3</p> $2(3x - 2y) = 2(4)$ $-3(2x - 5y) = -3(-1)$ $6x - 4y = 8$ $-6x + 15y = 3$ <p>Add these equations, & solve $11y = 11; y = 1$ Substitute $y = 1$ into eqn (1) $3x - 2(1) = 4$ $3x - 2 = 4$ $3x = 6$ $X = 2$</p> <p>Solution is (2,1).</p>	<p>29. $5x - y = 20$ $3x + y = 12$</p>	<p>30. $3x - 2y = 11$ $3x - y = 7$</p>
<p>31. $5x + 2y = 19$ $3x - 4y = 1$</p>	<p>32. $3x - 2y = 1$ $x - 2y = -21$</p>	<p>33. $6x + 15 = 90$ $3x - 7y = 16$</p>

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Quadratic Equations: Solve by setting to zero and factoring:

<p>Example:</p> $3x^2 + 14x = -8$ $3x^2 + 14x + 8 = 0$ $(3x + 2)(x + 4) = 0$ $3x + 2 = 0 \quad \text{or} \quad x + 4 = 0$ $3x = -2 \quad \quad \quad x = -4$ $x = -\frac{2}{3}$ <p>Solutions: $-\frac{2}{3}$ or -4</p>	34. $x^2 - 5x + 6 = 0$	35. $x^2 - 144 = 25$
36. $x^2 + 25 = 10x$	37. $x^2 + 8x = 0$	38. $x(x + 5) = 14$
39. $50x^2 = 200$	40. $(x - 5)^2 = 16$	41. $x^2 = 20 + 8x$
42. $6x^2 = 5x + 6$	43. $x^2 - 625 = 0$	44. $x^2 + 7x = 18$

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Simplify these fractions: reduce by common factors.

Example: $\frac{x+6}{36-x^2}$ $= \frac{(x+6)}{(6-x)(6+x)}$ $= \frac{1}{6-x}$	45. $\frac{14}{70}$	46. $\frac{27x}{18}$
47. $\frac{15bc}{5b^2}$	48. $\frac{-12r^3t}{18r^2t}$	49. $\frac{x^2 - 12x + 35}{x^2 - 25}$
50. $\frac{9x - 6y}{3}$	51. $\frac{11xy - 22y}{33y}$	52. $\frac{3x^2 + 2x - 8}{3x^2 - 6x - 24}$
53. $\frac{x^2 - y^2}{x + y}$	54. $\frac{54a^4b^6c^3}{36ab^3c}$	55. $\frac{125rs^2t^4}{10r^2s^3t}$

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Simplify these radical as much as possible, without a calculator:

Example: $\sqrt{24} = \sqrt{4} \sqrt{6} = 2\sqrt{6}$	Example: $\sqrt{\frac{4}{5}} = \frac{\sqrt{4}}{\sqrt{5}} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$ $= \frac{2\sqrt{5}}{\sqrt{25}} = \frac{2\sqrt{5}}{5}$	Example: $(2\sqrt{3})^2 = (2\sqrt{3})(2\sqrt{3})$ $= (2)(2)\sqrt{3}\sqrt{3}$ $= 4\sqrt{9} = (4)(3) = 12$
56. $\sqrt{121}$	57. $\sqrt{2500}$	58. $\sqrt{2} \sqrt{18}$
59. $\sqrt{6} \sqrt{30}$	60. $4\sqrt{28}$	61. $\sqrt{196}$
62. $(7\sqrt{2})^2$	63. $\sqrt{12\frac{1}{4}}$	64. $5\sqrt{32}$
65. $3\sqrt{24}$	66. $\sqrt{169}$	67. $\sqrt{128}$
68. $\sqrt{250}$	69. $\sqrt{12} \sqrt{3}$	70. $(\sqrt{5})^3$

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Simplify these exponential expressions.

<p>SAMPLES:</p> $x^0 = 1$ $x^2x^3 = x^{(2+3)} = x^5$ $\frac{x^7}{x^3} = x^{(7-3)} = x^4$ $(x^3)^2 = x^{(3)(2)} = x^6$	<p>SAMPLES:</p> $x^{-2} = \frac{1}{x^2}$ $(-5)^2 = (-5)(-5) = 25$ $-5^2 = -(5)(5) = -25$ $(-5)^{-2} = \frac{1}{(-5)^2} = \frac{1}{25}$	71. 5^{-2}
72. 13^0	73. $4^22^33^{-2} =$	74. $5^25^45^{-3}$
75. $(-1)^9$	76. $(-3x^2yw^5)(5xy^3w^{-3})$	77. $(-1)^65x^0$
78. $(c^2d^3)^4$	79. $(e^3)^{-2}$	80. $\frac{x^4}{x^6}$

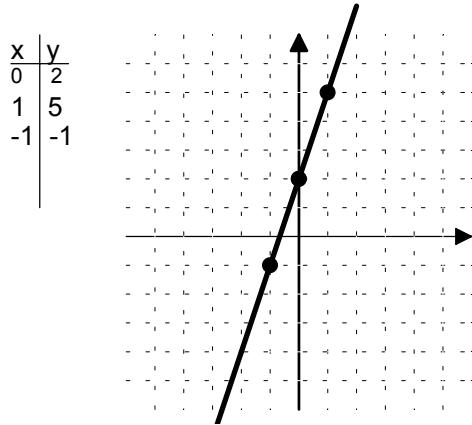
Evaluate each expression.

Draw the graph for each equation:

<p>Example:</p> <p>Evaluate LW when L = 4, W = 3.2</p> <p>Answer: LW = (4)(3.2) = 12.8</p>	<p>Example:</p> <p>Evaluate $x^2y + z$ when</p> <p>X = 3, y = -2, z = 5</p> $x^2y + z = 3^2(-2) + 5 = -13$	81. $\frac{x+7}{y-3}$ when $x=-2, y=-4$
82. MX + B when $M = \frac{1}{3}, x = -9, B = 5$	83. $\frac{1}{2}(a+B)c$ When a = 2, B = 8, c = 3	84. $\frac{4}{3}(3.14)r^3$ When r = 6

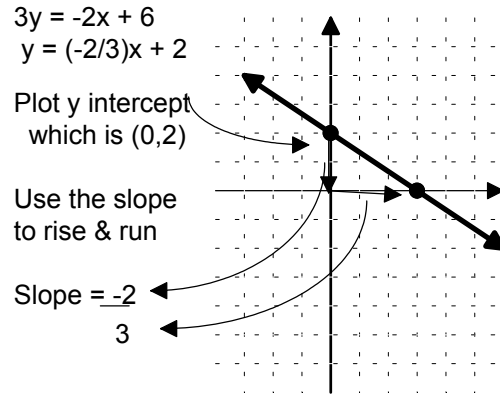
Example:

$$y = 3x + 2$$

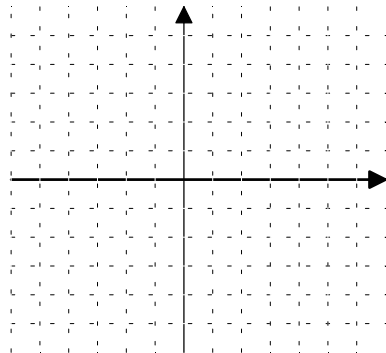


Example:

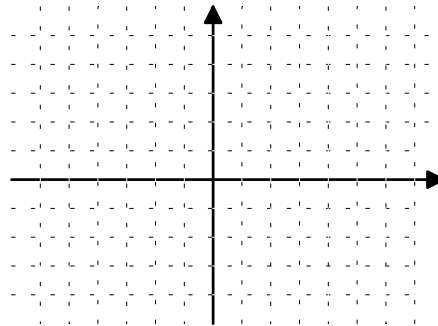
$$2x + 3y = 6$$



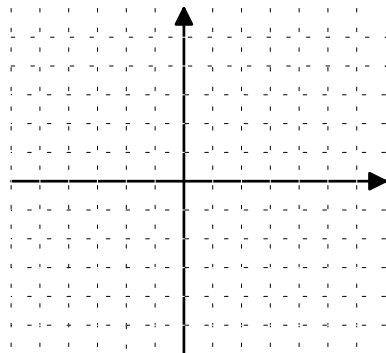
85. $y = -2x + 3$



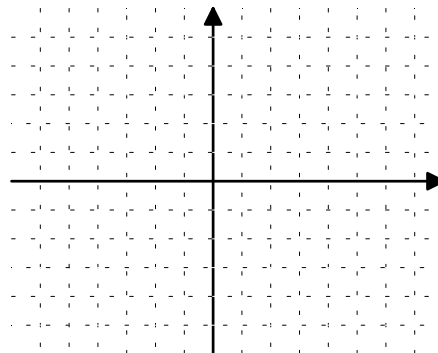
86. $2x - y = 5$



87. $y = 3x - 4$



88. $2x - 3y = 9$

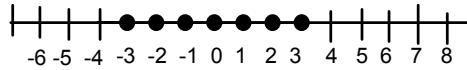


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Solve the following inequalities, and graph the solution on a number line:

Example: $|x| \leq 3$, $x \in \text{integers}$

$$x \geq -3 \text{ and } x \leq +3$$

**Example:** $2|x - 1| + 1 \geq 5$ and $x \in \text{real numbers}$

$$2|x - 1| \geq 4$$

$$|x - 1| \geq 2$$

$$x - 1 \leq -2 \quad \text{or} \quad x - 1 \geq +2$$

$$x \leq -1 \quad \text{or} \quad x \geq +3$$



89. $|3x| + 3 \leq 18$ and $x \in \text{real numbers}$

90. $3x + 5 < 29$ and $x \in \text{real numbers}$

91. $28 - x > 4 + 2x$, and $x \in \text{integers}$

92. $17 - 3x \leq 31 + 4x$ and $x \in \text{integers}$

93. $|x + 3| - 5 \geq -2$ and $x \in \text{integers}$

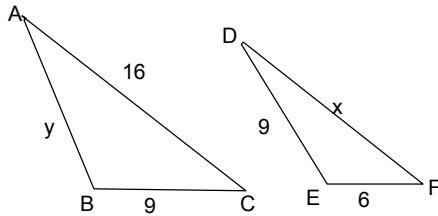
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Review problems from Geometry: Show your work!

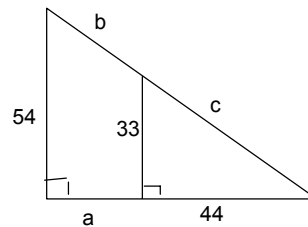
94. Twice the complement of angle A is 35° less than the supplement of angle A . Find angle A .

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

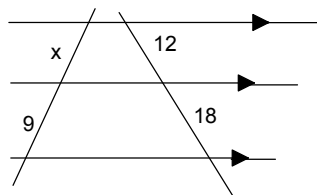
96. Given that triangle ABC and triangle DEF are similar. Solve for x and y .



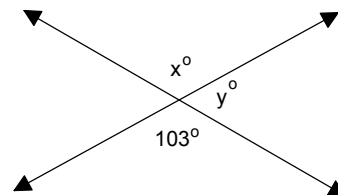
97. Find a , b , and c .



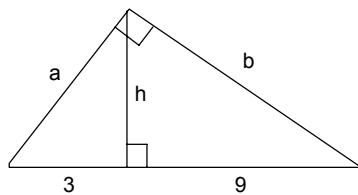
98. Find x .



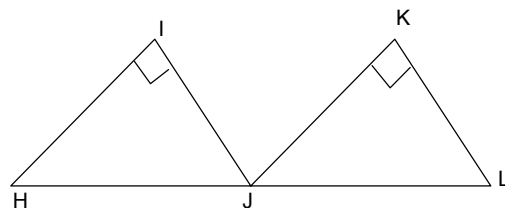
99. Find x and y .



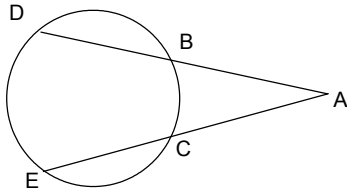
100. Find a , b , and h .



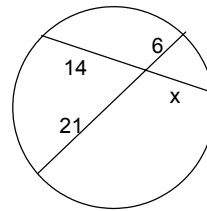
101. Which congruency principle would you use to prove that $\triangle HIJ \cong \triangle JKL$ if $HI \cong JK$ and $IJ \cong KL$? (Recall: SSS, SAS, ASA, AAS, HL)



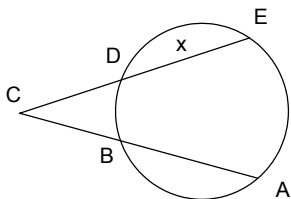
102. If $m\widehat{DE} = 122$ and $m\widehat{BC} = 78$, find $m\angle A$.



103. Solve for x:

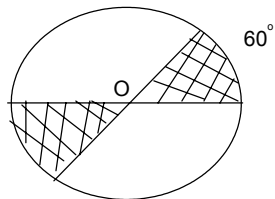


104. Find the value of x if $AB = 24$, $BC = 10$, $CD = 11$.

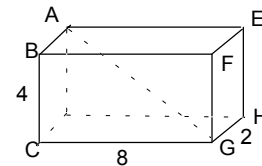


105. An equilateral triangle has a perimeter of $24\sqrt{3} m$ and an area of $48\sqrt{3} m^2$. Find the altitude of the triangle.

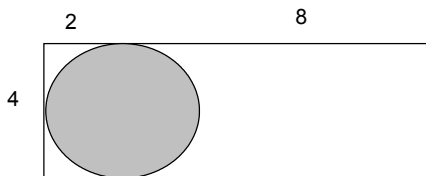
106. In circle O, the radius is 3 meters. Find the area of the shaded sectors.



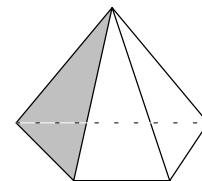
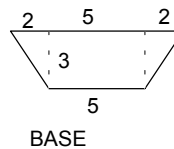
107. Find the length of the diagonal AG in the solid right rectangular prism shown below:

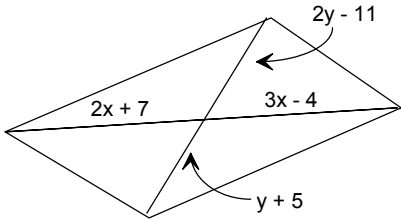
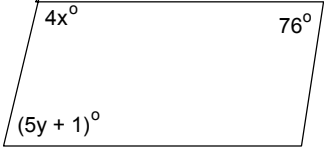
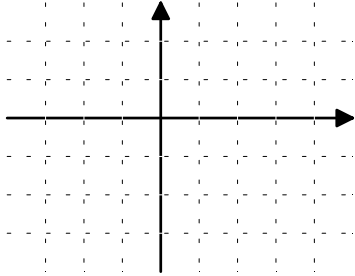
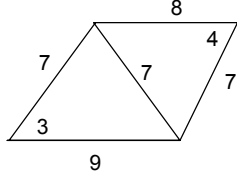
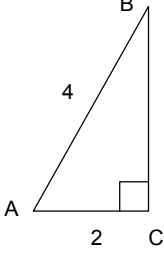


108. Find the area that is UNSHADED, if the circle is tangent to 3 sides of the rectangle:



109. Find the volume of trapezoidal pyramid, whose altitude is 5 feet. Dimensions are in feet.



<p>110. Find the values of x and y that will make this quadrilateral a parallelogram:</p> 	<p>111. What values must x and y have to make this quadrilateral a parallelogram?</p> 
<p>120. What specific quadrilateral has diagonals that bisect each other perpendicularly?</p>	<p>121. Write the following sentence as an "if...then..." conditional; then write its converse and contrapositive sentences:</p> <p style="text-align: center;"><i>All squares are rectangles.</i></p> <p>Identify which of the three sentences are true, and which are false.</p>
<p>122. Calculate the midpoint, slope and length of the segment determined by the points $(-3, -4)$ and $(5, 2)$.</p>	<p>123. Graph the linear equation $x = 2$</p> 
<p>124. Which is larger: <3 or <4 ?</p> 	<p>125. Calculate the length of BC in simplest radical form, then use this triangle to express the fractions in simplest form:</p>  <p> $BC =$ $\sin A =$ $\cos A =$ $\tan A =$ </p>