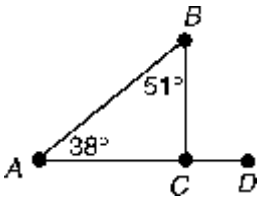
INTEGRATED MATH III SUMMER PACKET

DUE THE FIRST DAY OF SCHOOL

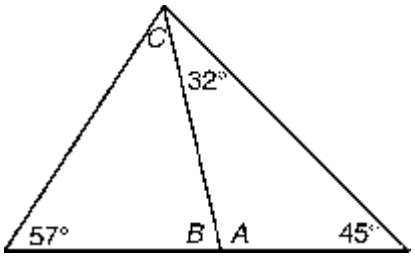
The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in Integrated Math IV. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your first quarter grade. **Upon returning, you will be ASSESSED on the content of this packet**. All contents outlined in the packet are Integrated Math I objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

1. A grab bag contains 3 football cards and 7 basketball cards. An experiment consists of taking one card out of the bag, replacing it, and then selecting another card. Find the probability of selecting a football card and then a basketball card. Express your answer as a decimal.

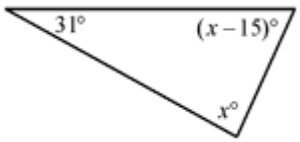
2. Find the measure of exterior angle $\angle BCD$.



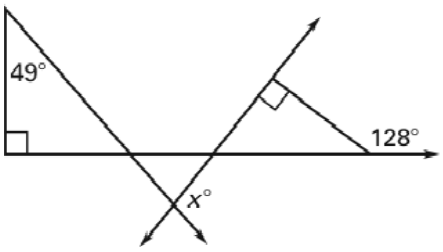
3. Find the measures of angles *A*, *B*, and *C*.



4. Solve for *x*.



5. Find the measure of $\angle B$.



A triangle has the given vertices. Classify the triangle by its sides. Then determine if it is a right triangle.

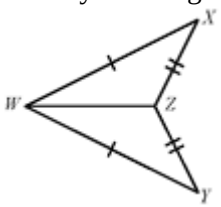
6. $A(-2, 2), B(0, 0), C(3.5, 3.5)$

7. $A(-4, 4), B(0, 1), C(-4, -2)$

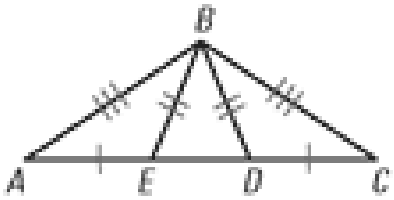
The expressions given represent the measures of the acute angles of a right triangle. Find the measure of each acute angle.

8. $6x^{\circ}, 9x^{\circ}$

9. Identify the congruent triangles. How do you know they are congruent?



Use the diagram to decide whether the congruence statement is true. Explain your reasoning.



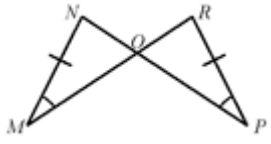
10. $\Delta ABD \cong \Delta CBE$

11. Given points $O(0, 0)$, $A(0, 4)$, $B(3, 0)$, $C(-4, 0)$, and $D(0, y)$, find two values of *y* so that $\Delta OBA \cong \Delta ODC$.

Find the zeros of the function.

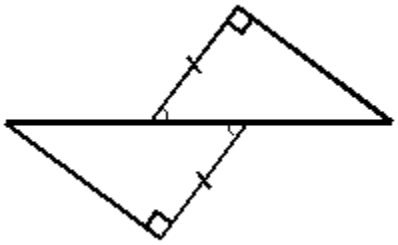
12. $y = x^2 - 11x + 18$

13. Identify the congruent triangles. How do you know they are congruent?



Would HL, ASA, SAS, AAS, or SSS be used to justify that the pair of triangles is congruent?

14.



Simplify the expression.

15. $\sqrt{72}$

16. Solve the equation. $\frac{1}{3}x^2 + 1 = 33$

17. Solve the equation. $4x^2 + 5 = -7$

Write the expression as a complex number in standard form.

18. $-i + (7 - 5i) - 3(2 - 3i)$

19. $i(2 + i)$

20. $(2 + 3i)(1 - 4i)$

21. $(2i)(1 - 4i)(1 + i)$

22. $\frac{5}{1 + i}$

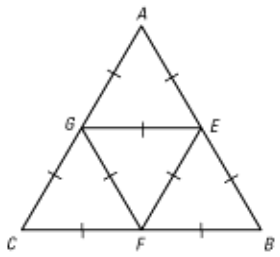
Find the absolute value of the complex number.

23. $-5i$

24. $-2 + i$

25. Write the expression $(5 + 7i)(5 - 7i)$ as a complex number in standard form.

26. The perimeter of $\triangle ABC$ is 18. What is measure of $\overline{FG}$?



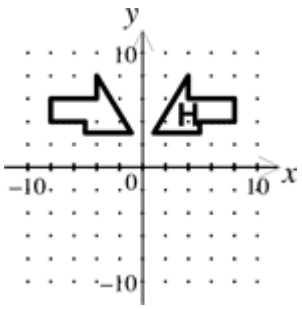
27. In ΔABC, $AC = BC$. The length of $\overline{AC}$ is three times the length of $\overline{AB}$. Find the lengths of all three sides of the triangle if the perimeter of the triangle is 35 inches.

Describe the given translation using coordinate notation.

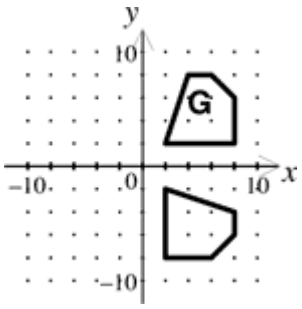
28. Every point moves to the right 4 units and down 3 units.

Tell whether the transformation of the polygon containing a letter onto the polygon without a letter is a rotation about the origin. If so, give the angle and direction of rotation.

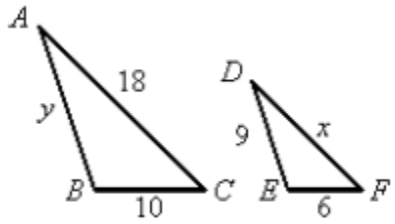
29.



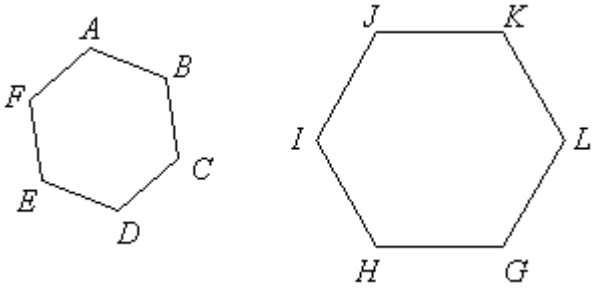
30.



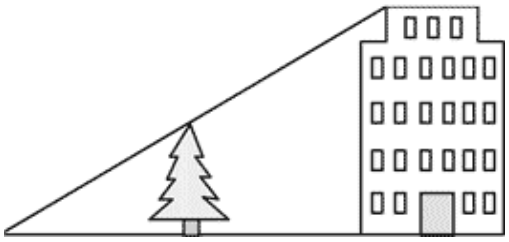
31. Given that $\Delta ABC \sim \Delta DEF$, solve for x and y.



32. In the figure (not drawn to scale), the hexagon *ABCDEF* is similar to hexagon *JKLGHI*. Find length *BC* to the nearest tenth if *KL* = 14, *LG* = 18, and *CD* = 9.



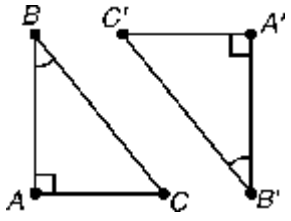
33. Moody wants to find the height of the tallest building in his city. He stands 422 feet away from the building. There is a tree 40 feet in front of him, which he knows is 22 feet tall. How tall is the building? (Round to the nearest foot.)



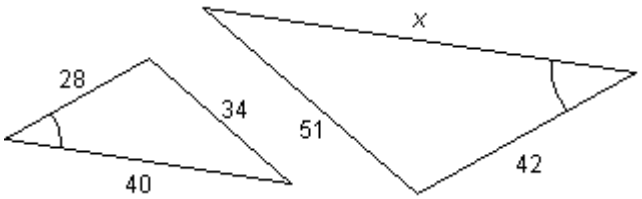
Determine whether the triangles are similar. If the are, write a similarity statement.

34.

35. State the postulate or theorem that can be used to prove that the two triangles are similar.

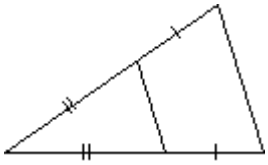


36. What value of *x* will make the two triangles similar?

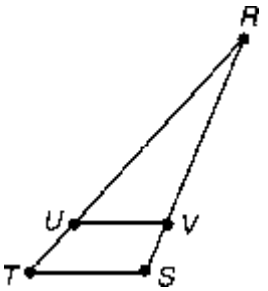


Tell whether each pair of triangles is similar. Explain your reasoning.

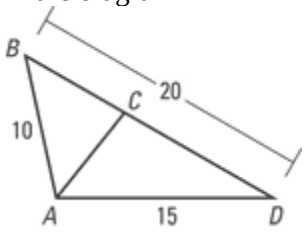
37.



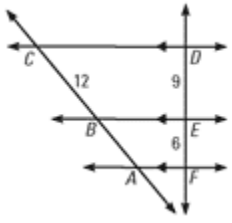
38. Given that $\frac{RU}{UT} = \frac{RV}{VS}$, what is the relationship between $\overline{UV}$ and $\overline{TS}$?



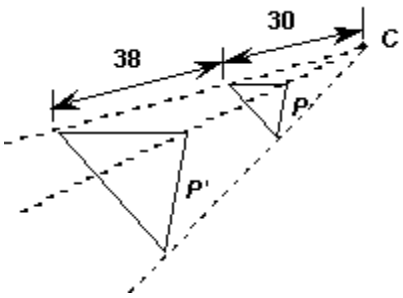
39. In the diagram $\angle BAC \cong \angle CAD$. Use the given side lengths to find the length of $\overline{BC}$.



40. Find *AC*.

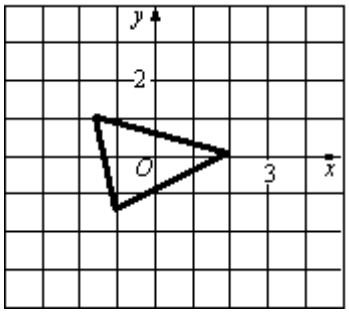


41. Find the scale factor to two decimal places for the dilation shown below. The original figure is P.

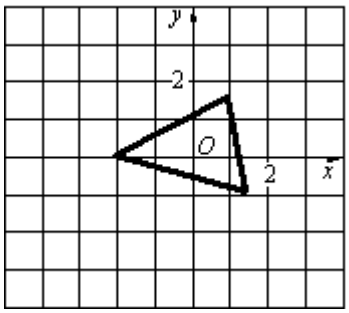


Draw the image of the given figure after a dilation with center *O* and the given scale factor.

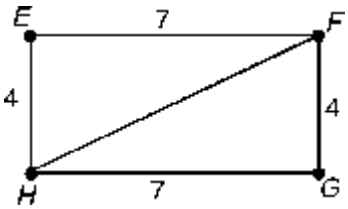
42. scale factor: 2



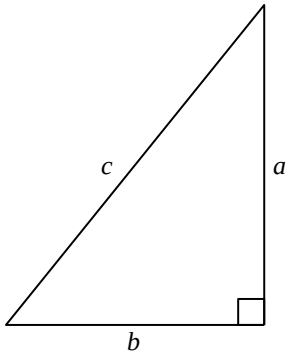
43. scale factor: 2



44. If *EFGH* is a rectangle, what is *FH*?



45. Find the area of this right triangle if $b = 14$ and $c = 2\sqrt{130}$.



46. Find the area of the isosceles triangle with side lengths 14 inches, 25 inches, and 25 inches.

47. Solve the system by substitution: $y = 3x + 3$
$y = 2x$

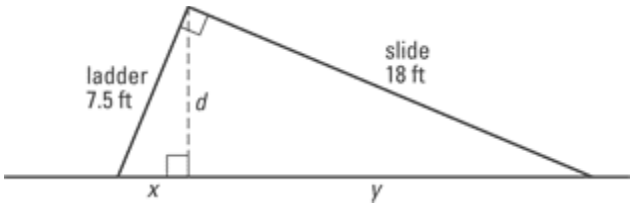
48. The Modern Grocery has cashews that sell for $4.00 a pound and peanuts that sell for $2.50 a pound. How much of each must Albert, the grocer, mix to get 60 pounds of mixture that he can sell for $3.00 per pound? Express the problem as a system of linear equations and solve using the method of your choice.

49. Solve the system.
$y = -4x + 4$
$y = -x - 5$

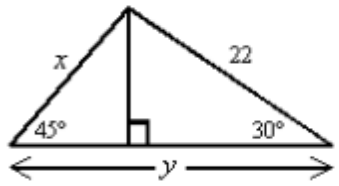
50. Solve the linear system: $3x + 2y = -7$
$x + 2y = -9$

51. Solve the linear system: $-2x + y = -1$
$3x = 9 - y$

52. There is a slide in the park that is 18 feet long. The ladder to the top of the slide is 7.5 feet long. If the ladder and the slide are perpendicular, what is *d*, the distance from the top of the slide to the ground? Explain how you got your answer.



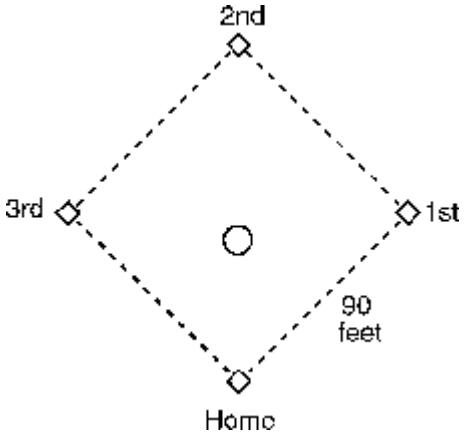
53. Find the value of *x* and *y*.



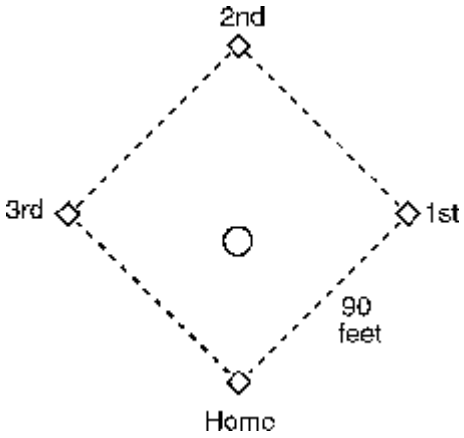
54. The length of the diagonal of a square is 22. What is the length of each side?

55. The altitude of an equilateral triangle is 6. What is the length of each side?

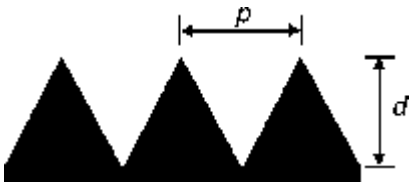
56. A baseball "diamond" is a square with a side length of 90 feet. How far is the throw from third base to first base? (Round your answer to one decimal place.)



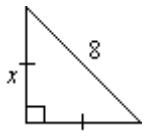
57. A baseball "diamond" is a square of side length 90 feet. How far is the throw, to one decimal place, from home plate to second base?



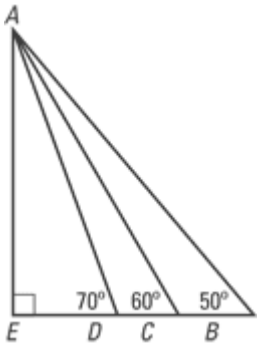
58. The cross section of a V-thread on a screw is an equilateral triangle. The distance p between successive threads is known as the PITCH of the thread, and the distance d is the DEPTH of the thread. If $p = \frac{1}{8}$ inch, what is d?



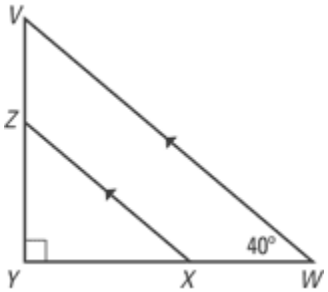
59. Find the value of x.



60. a. What is a tangent ratio?
    b. Find $\tan 50^\circ$, $\tan 60^\circ$, and $\tan 70^\circ$.
    c. What happens to the tangent ratio as the size of the angle increases?
    d. What is $\tan 90^\circ$? Explain why your answer is reasonable.

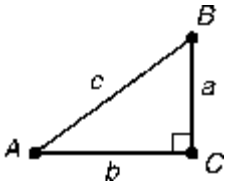


61. In the diagram, $\overline{VW} \parallel \overline{ZX}$. If $YX = 5$, what is ZX? Explain how you got your answer.



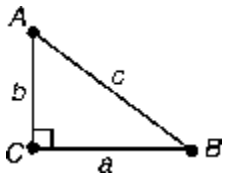
62. Write the trigonometric ratio.

    a. $\sin A$
    b. $\tan B$
    c. $\cos A$



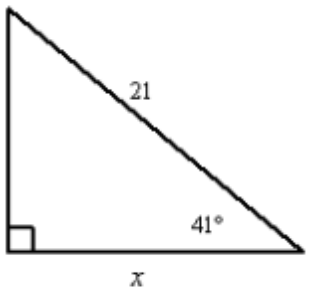
63. Write the trigonometric ratio.

a. cos *B*
b. tan *A*
c. sin *B*

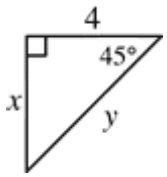


64. Use a calculator to find the value of cos 41° to four decimal places.

65. Find *x*, to the nearest hundredth.



66. Find the missing side lengths for *x* and *y*.



Find the measure of an acute angle that satisfies the given equation. Round your answers to the nearest tenth of a degree.

67. $\tan Y = \frac{40}{9}$

68. $\tan Y = \frac{9}{40}$

69. $\cos Z = \frac{12}{13}$

Simplify the expression.

70. $\left(3e^4 - 4\right) - \left(8e^3 + 2\right) + \left(4e^4 + 3e^3\right)$

Find the difference.

71. $\left(-7q^5 - 8q^4 + 6q^3 - 6q^2\right) - \left(-6q^4 + 2q^3 - 2q^2\right)$

Tell whether the expression is a polynomial. Write Yes or No.

72. $3x^5 + 2x^4 + 4x^3 + 4x^2 + 3x + 2$

73. $x^4 - x^2 + 2x - 9^{\frac{1}{2}}$

74. $-3x^3 + 3x^5 - 5x + 4$

75. Find the sum $\left(-5x^2 + 7x - 2\right) + \left(2 - 3x + 4x^2\right)$.

Find the product.

76. $17x(3x - 5)$

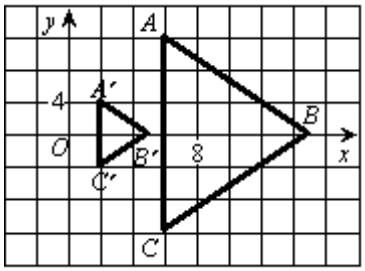
77. Use the FOIL pattern to find the product $\left(a^2 + 2\right)(3a - 1)$.

78. A rectangle has length $x + 5$ and width $x - 7$. Write an equation that represents the area, *A*, of the rectangle in terms of *x*.

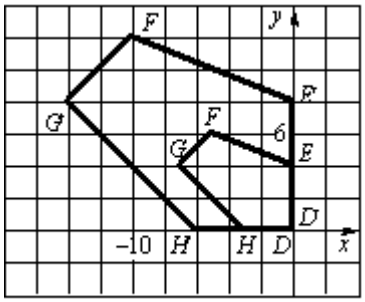
79. Use a vertical format to find the product $(3x - 2)\left(2x^2 - x + 1\right)$.

Write a product to represent the dilation.

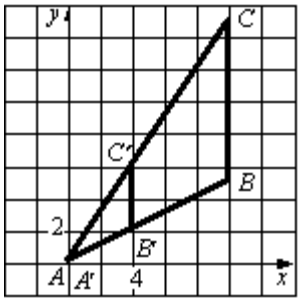
80. $ABC \rightarrow A'B'C'$



81. $DEFGH \rightarrow D'E'F'G'H'$



82. $ABC \rightarrow A'B'C'$



Tell what type of transformation is described.

83. The coordinates of the image are four times the corresponding coordinates of the original.

Solve the equation. Round the solutions to the nearest hundredth.

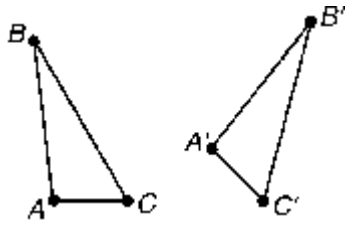
84. $3(x+6)^2 = 33$

An object is dropped from an initial height of *s* feet. The object's height at any time *t*, in seconds, is given by $h = -16t^2 + s$.

85. How long does it take for an object dropped from 300 feet to hit the ground? Round your result to two decimal places.

86. How long does it take for an object dropped from 254 feet to hit the ground? Round your result to two decimal places.

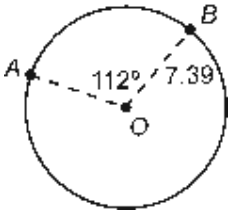
87. ΔABC and $\Delta A'B'C'$ are similar triangles with $\frac{A'B'}{AB} = \frac{5}{4}$. If the area of ΔABC is 80 square units, find the area of $\Delta A'B'C'$. (Note: Art is not drawn to scale.)



88. For a circle of radius 8 feet, find the arc length of the arc formed by a central angle of 24°. Leave your answer in terms of π.

89. The circumference of a circle is 60π cm. Find the diameter, the radius, and the length of an arc of 30°.

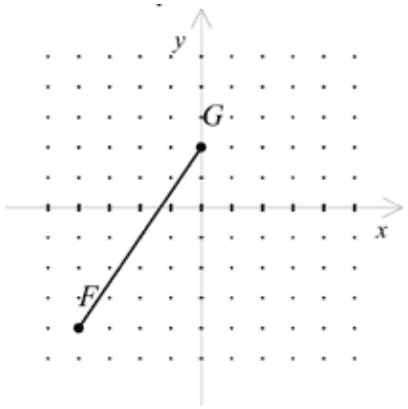
90. Circle *O* has a radius of 7.39. If $m\angle AOB$ is 112°, then find the length of $\overset{\frown}{AB}$ to one decimal place.



91. A team in science class placed a chalk mark on the side of a wheel and rolled the wheel in a straight line until the chalk mark returned to the same position. The team then measured the distance the wheel had rolled and found it to be 43 cm. To the nearest tenth, what is the radius of the wheel?

92. A timing gear in a machine takes 18 seconds to rotate one full turn. If the diameter of the gear is 28 centimeters, how many centimeters does an individual tooth on the gear move in 1 second? Use $\frac{22}{7}$ as an approximation for π.

93. Find the midpoint of $\overline{FG}$.

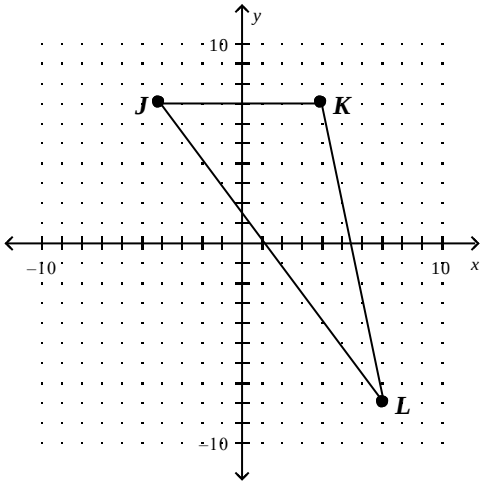


94. Determine the coordinates of the midpoint of $\overline{CG}$ and find the distance CG for the points $C(-8, -4)$ and $G(2, -3)$.

95. $M(4, 4)$ is the midpoint of $\overline{RS}$. If S has coordinates (9, 13), find the coordinates of R.

96. On a grid, the position of the school is $(-2, 5)$ and the position of the mall is $(-8, 15)$. What is the midpoint between the school and the mall?

97. Triangle JKL has vertices at $J(-4, 7)$, $K(4, 7)$, and $L(7, -8)$. What is the perimeter of the triangle? Carry any intermediate calculations out to the nearest thousandth and round the final answer to the nearest tenth of a unit.



Open-ended:

98. Using an overlapping circle and a polygon, invent questions regarding area. Include a drawing showing the relationship between the circle and polygon.

Find the excluded values, if any, of the expression.

99. $\frac{4}{b+9}$

100. Simplify the expression $\frac{x^2+4x}{x^2-16}$.

101. Simplify $\frac{x^2+4x-21}{3+5x-2x^2}$. State the excluded values.

Find the product.

102. $\frac{2(A-4)}{3} \cdot \frac{3}{8A-32}$

103. $\frac{2}{x-3} \cdot \frac{2x-6}{8(x+4)}$

Find the quotient.

104. $\frac{x^2-4}{x+5} \div (x-2)$

Solve the equation:

105. $\frac{k}{k-4} + \frac{k}{k-1} = 1$

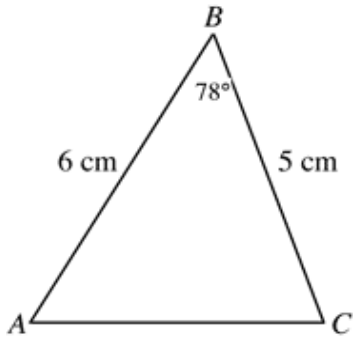
Use your calculator as needed.

106. Solve the proportion $\frac{x}{2x-1} = \frac{5}{3}$.

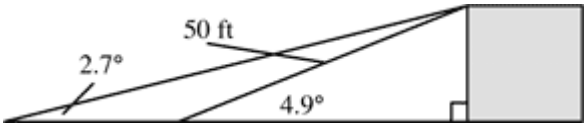
107. Given triangle *ABC* with $a = 3$, $A = 40°$, and $B = 27°$, find *c*. Round your answer to two decimal places.

108. Solve triangle *ABC* given that $A = 47°$, $B = 52°$, and $b = 78$.

109. Find the area of ΔABC. The figure is not drawn to scale.

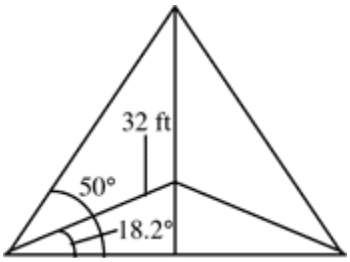


A 50-foot ramp makes an angle of $4.9°$ with the horizontal. To meet new accessibility guidelines, a new ramp must be built so it makes an angle of $2.7°$ with the horizontal.



110. What will be the length of the new ramp?

The roof of a house is being reconstructed to accommodate heavy snows. The current 32-foot roofline makes an $18.2°$ angle with the horizontal. The owner has decided to construct the new roof so that it makes a $50°$ angle with the horizontal.



111. How much higher will the new roof be?

Find the value of the variable that makes the ratios equivalent.

112. $\frac{x}{15} = \frac{16}{12}$

Write the equivalent rate.

113. $\frac{12 \text{ feet}}{\text{min}} = \frac{? \text{ feet}}{\text{hour}}$

Solve the proportion.

114. $\frac{2}{x} = \frac{8}{28}$

115. A youth soccer team eats 8 pounds of oranges per game. Use the proportion to determine how many pounds of oranges the team eats in 6 games.

$$\frac{8 \text{ pounds}}{1 \text{ game}} = \frac{?}{6 \text{ games}}$$

116. The motels and hotels in a beach-side town are required to add a room-occupancy tax of $6\frac{3}{4}\%$ to every customer's bill. What decimal is used to calculate the tax on each bill?

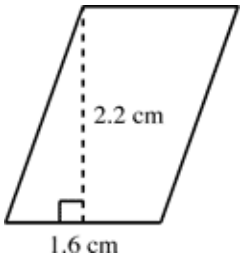
Find the total cost. Round to the nearest tenth.

117. Original price: $86
Sales tax: 8%

118. You have $40.00. You wish to buy a T-shirt costing $14.50 and a pair of jeans costing $23.95. There is a 5% sales tax on clothing. Do you have enough money to pay for both?

Find the area of the parallelogram. (The figure may not be drawn to scale.)

119.



Sketch the quadrilateral. Then use an area formula to find the unknown dimension.

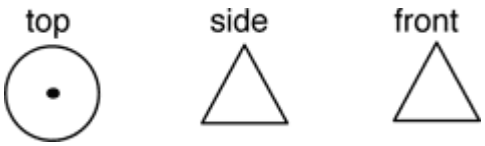
120. A trapezoid has an area of 87 square units. Its bases are 13 units and 16 units. Find the height.

Show two ways to represent the solid. Then count the number of faces, edges, and vertices.

121. hexagonal pyramid

Sketch the solid with the given views.

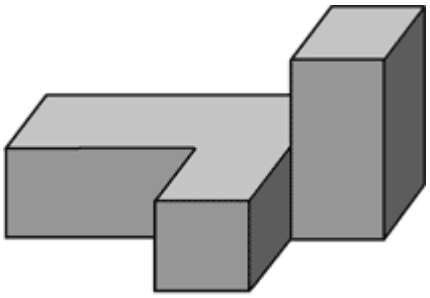
122.



123.

top front side

124. **Write your answer on a separate piece of paper.**



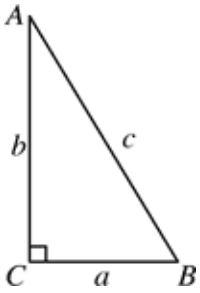
Draw the top, front, and right side views of the solid shown above.

125. Solve by factoring: $x^2 - 18x + 81 = 0$

Solve.

126. $42x^2 - 14x - 56 = 0$

127. Solve ΔABC using the diagram and the given measurements. (The triangle is not drawn to scale.)
$A = 45°$, $a = 3$



128. A ladder 12 feet long makes an angle of 67° with the ground as it leans against a store. How far up the side of the store does the ladder reach?

129. A slide 2.8 m long makes an angle of 29° with the ground. How high is the top of the slide above the ground?

130. The height of a triangle is three feet longer than the base. The area of the triangle is 35 square feet. Find the height and base of the triangle.