Integrated Math III Summer Review 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.

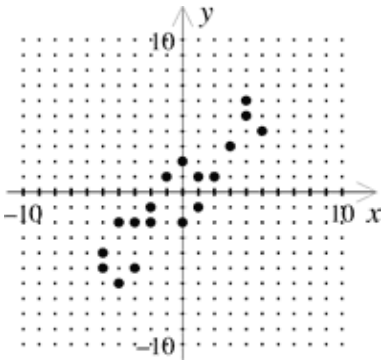
1. Solve the inequality. Then graph your solution.
$2x + 5 \geq 2 - (x - 9)$

2. Is $x = \frac{5}{2}$ a solution of the inequality $5x - 4 \leq 3(x - 7)$?

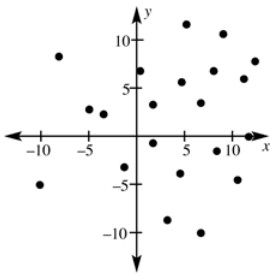
Solve the inequality. Then graph the solution.

3. $x + 5 \leq 6$ or $-6x < -54$

4. Describe the correlation shown by the scatter plot.

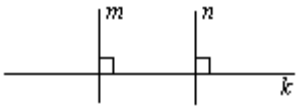


5. For the scatter plot shown, state whether *x* and *y* have a *positive correlation*, a *negative correlation*, or *no correlation*.



6. For the data given, approximate the equation of the best-fitting line.

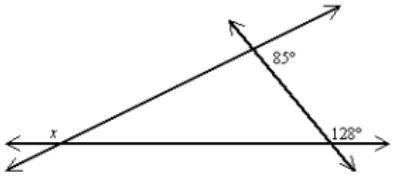
7. Tell whether lines *m* and *n* are parallel or not parallel and explain.



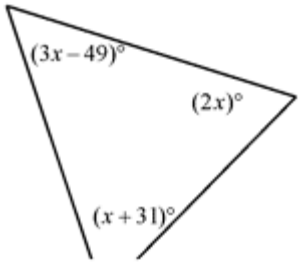
8. Find the distance between the lines with the equations $y = x + 3$ and $y = x - 2$.

9. Find the distance between the lines with the equations $y = -\frac{3}{2}x + 1$ and $2y + 3x = 10$.

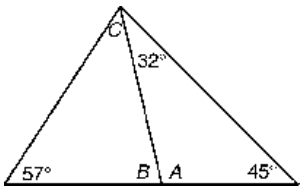
10. Find the value of *x*.



11. Find the measures of all three angles of the triangle.



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



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

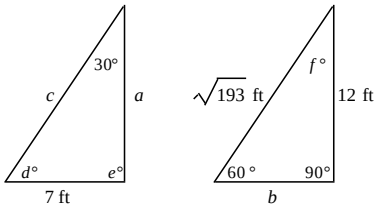
13. $A(-2, 2), B(0, 0), C(3.5, 3.5)$

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

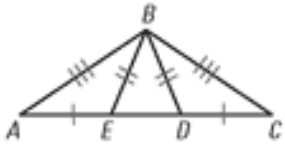
14. $5x^{\circ}, 13x^{\circ}$

15. $(x-3)^{\circ}, (11x-3)^{\circ}$

16. The two triangle-shaped gardens are congruent. Find the missing side lengths and angle measures.

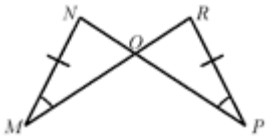


Use the diagram to decide whether the congruence statement is true. Explain your reasoning.



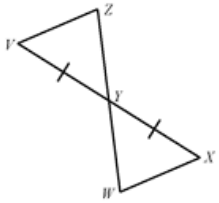
17. $\triangle ABE \cong \triangle DBC$

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

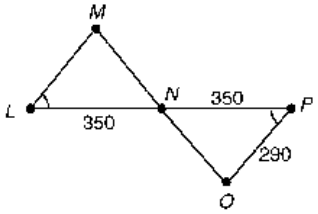


State one additional fact that is needed for the pair of triangles to be congruent. Identify the postulate or theorem you would then use to prove the congruence.

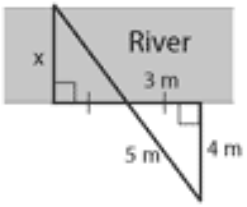
19.



20. Find the length of $\overline{LM}$. State the postulate or theorem you use.

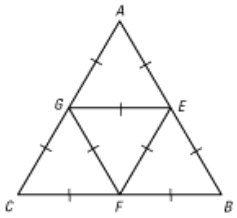


21. Use the measurements given in the diagram to find the distance *x* across the river.



22.

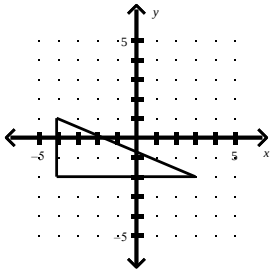
The perimeter of $\triangle ABC$ is 18. What is measure of $\overline{FG}$?



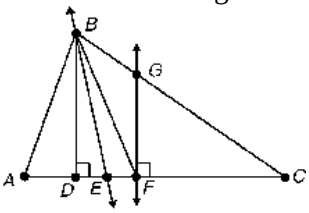
Describe the given translation using coordinate notation.

23. Every point moves to the right 3 units and up 4 units.

24. For the triangle, find the coordinates of the point of concurrency of the perpendicular bisectors of the sides.

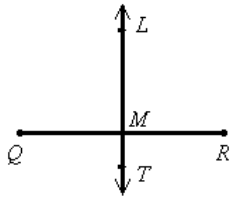


25. Refer to the figure below.

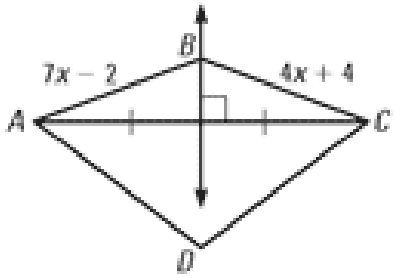


Given: $\overline{AF} \cong \overline{FC}$
Which line is a perpendicular bisector in $\triangle ABC$?

26. Given: $\overleftrightarrow{LT}$ is the $\perp$ bisector of $\overline{QR}$.
Name three things that you can conclude.

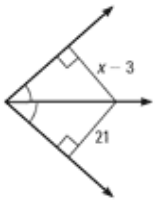


27. Find *AB*. Is there enough information to show that *D* lies on the vertical line that passes through *B*?



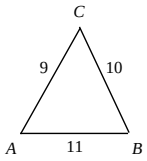
Find the value of *x*.

28.



29. The altitudes of a triangle are concurrent. What is the name of their common point?

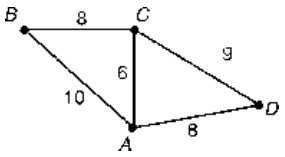
30. Identify the largest angle of ΔABC.



31. Can the measurements 1.4 meters, 2.7 meters, and 9.3 meters be the lengths of the sides of a triangle? Write Yes or No.

32. Write an equation of the line that passes through $(7, -8)$ and is parallel to the line $y = 4x + 5$.

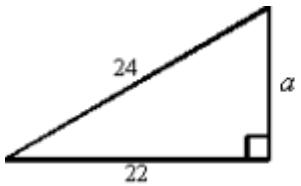
33. Refer to the figure. What is the largest angle that is part of a triangle, in the figure?



Solve the inequality, if possible.

34. $10 + 5x > 5(3 + x)$

35. Find the length of the leg of this right triangle. Give an approximation to 3 decimal places.

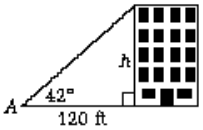


36. How long is a string reaching from the top of a 20-ft pole to a point on the ground that is 10 ft from the bottom of the pole? Give an exact answer and an approximation to 3 decimal places.

37. A boat traveled in a straight line through calm seas until it was 43 kilometers west and 41 kilometers south of its original position. Find how far the boat traveled, to the nearest tenth of a kilometer.

38. A triangle has side lengths of 7, 9, and 11. Decide whether it is an acute, right, or obtuse triangle.

39. Explain how a tangent ratio can be used to find the height of the building in the figure below. Find the height of the building when $\angle A = 42°$.



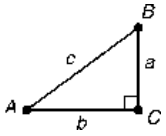
Use a special right triangle to find the tangent of the given angle.

40. 60°

41. 60°

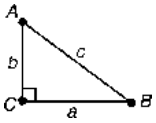
42. Write the trigonometric ratio.

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



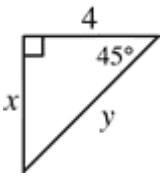
43. Write the trigonometric ratio.

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

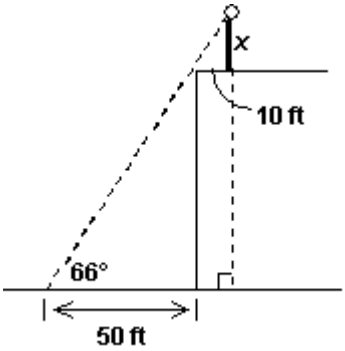


44. Use a calculator to find the value of cos 41° to four decimal places.

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



46. An antenna is atop the roof of a 100-foot building, 10 feet from the edge, as shown in the figure below. From a point 50 feet from the base of the building, the angle from ground level to the top of the antenna is 66°. Find *x*, the height of the antenna, to the nearest foot.

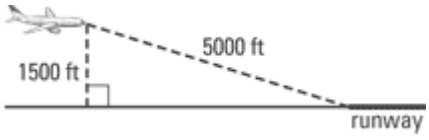


Find the measure of an acute angle that satisfies the given equation. Round your answers to the nearest tenth of a degree.

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

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

49. An airplane is flying at an elevation of 1500 feet. What is the airplane's angle of elevation from the runway when it is 5000 feet from the runway? Explain.



Simplify the expression using positive exponents.

50. $\frac{4^{10}}{4^5}$.

51. Rewrite the expression using positive exponents.
$(-2)^0\left(3x^{-2}y^{-2}\right)^{-1}$

52. Rewrite the expression using positive exponents.
$\frac{-3^0}{4x^{-3}}$

53. Rewrite the expression using positive exponents.
$\frac{7A^{-1}}{B^{-2}}$

54. Evaluate the expression $\frac{7^4}{7^5}$.

55. Suppose a particle has a mass of 10^{-4} kilogram. What would the mass of 10^9 of these particles be?

56. If the diagonals of a parallelogram are perpendicular, then the parallelogram is also what type of figure?

57. If the diagonals of a parallelogram are equal in length, then the parallelogram is also what type of figure?

58. True or false: A rhombus is a regular polygon.

59. True or false: A square is a rectangle.

60. True or false: A rectangle is an equiangular quadrilateral.

Give the possible coordinates of the vertices of the quadrilateral so that the diagonals lie on the *x*- and *y*-axes.

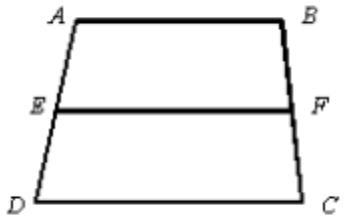
61. a rhombus with its horizontal diagonal longer than its vertical diagonal

62. a rhombus with its horizontal diagonal shorter than its vertical diagonal

True or False:

63. All squares are quadrilaterals.

64. Given: Trapezoid *ABCD* with midsegment $\overline{EF}$. If $EF = 23$ and $DC = 26$, find the length of $\overline{AB}$.



65. One side of a kite is 5 cm less than 2 times the length of another. If the perimeter is 8 cm, find the length of each side of the kite.

66. Find the degree of the polynomial $-8x^2 + x - 2$.

67. Classify the expression $9 + 3d^3$ by the number of its terms and state its degree.

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

68. $4x^6 - x^3 + 5$

69. $\frac{1}{2}x^2 + \frac{x+3}{4}$

70. $\frac{x-3}{5} - \frac{x}{5}$

71. Find the difference $\left(3z^3 + 2z^2 + 7\right) - \left(z^3 - 3z - 6\right)$.

Find the product.

72. $3x^2\left(4 - x^2\right)$

73. $-3x^2\left(2x^2 - 5x - 3\right)$

74. Use the FOIL pattern to find the product $(2x-5)(3x+4)$.

75. Solve the equation $30x^2 + 11x - 30 = 0$.

Factor the trinomial.

76. $25x^2 - 15x + 2$

77. $x^2 - 3x - 10$

78. $4x^2 - 4x - 3$

79. $-6x^2 + 19x - 10$

80. The width (in meters) of a rectangle is 3 more than twice its length. The area is 35 square meters. What is the length of the rectangle?

Solve the equation.

81. $3x^2 + 30x + 75 = 0$

Factor the polynomial.

82. $36t^2 - 16$

83. $4n^2 - 28n + 49$

84. An object is launched upward from the ground with an initial vertical velocity of 40 feet per second. After how many seconds does the object reach a height of 25 feet? Justify your answer.

Factor the polynomial completely.

85. $x^2 + 7x + 9x + 63$

86. Factor the expression $k^2(3-k) + 2k(k-3)$.

Simplify:

87. $7\sqrt{121}$

Simplify:

88. $3\sqrt{3} + 9\sqrt{3} - 4\sqrt{3}$

89. Simplify the radical expression.
$\sqrt{\frac{98}{27}}$

90. Perform the indicated operations and simplify the result.
$\left(\sqrt{5} - \sqrt{3}\right)\sqrt{15}$

Simplify the expression.

91. $\sqrt{144x^2}$

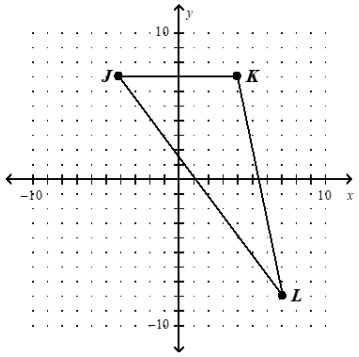
92. $\sqrt{81q^6}$

93. $\sqrt{75z^{18}}$

94. The tires of an automobile have a diameter of 22 inches. If the wheels revolve ten times, how far does the automobile move? (Round the result to the nearest tenth of a foot.)

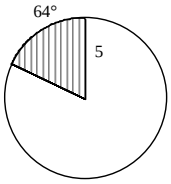
95. On a grid, the position of the school is $(-2, 5)$ and the position of the mall is $(-8, 15)$. What is the midpoint between the school and the mall?

96. 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.



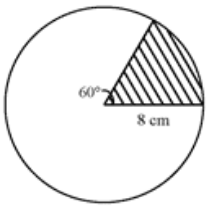
97. The distance between (5, 1) and (–2, *b*) is $\sqrt{85}$ units. Find the value of *b*.

98. Find the area of the shaded sector in terms of π.



99. In circle *O*, the measure of $\overset{\frown}{AB}$ is 120° and the area of the sector with central angle *AOB* is $48\pi \text{ in.}^2$. Find the radius of circle *O* and the length of $\overset{\frown}{AB}$.

100. Find the area of the shaded region. Use $\pi \approx 3.14$.

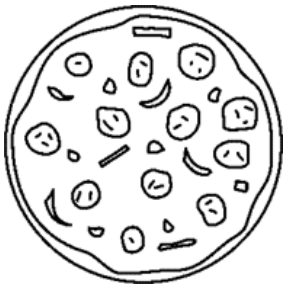


101. A round pizza, with diameter 42 cm, is cut into 12 equal sectors. A square pizza, with side length 52 cm, is cut into 9 equal squares. Which pizza slice, sector or square, has the greatest area? How much greater is it, to the nearest tenth of a square centimeter?

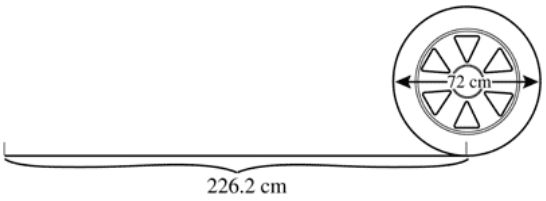
Find the circumference of the circle.

Use $\frac{22}{7}$ or 3.14 for π.

102. $r = 9$ in.



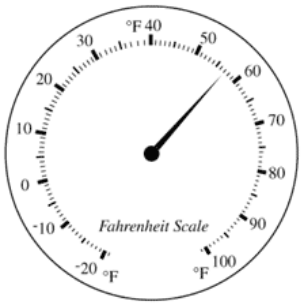
103. Aaron measured the circumference of a tire by making a mark on the tire, marking the ground the first time the mark touched the ground, and rolling the tire until the same tire mark touched the ground again. He then measured the distance the tire had rolled.



What number expresses the ratio between the circumference of the tire and the diameter of the tire?

Find the area of the circle. Use 3.14 for π.

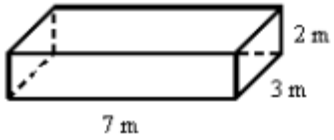
104. $r = 35$ mm



Find the area of the circle. Use 3.14 for π.

105. $d = 14$ in.

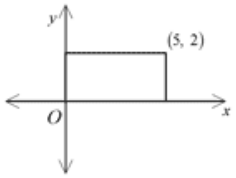
106. Find the volume of the rectangular prism.



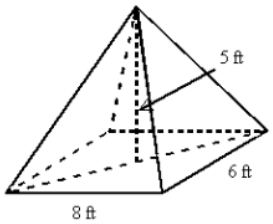
107. Johannas is building a square sandbox with sides 3 feet long. He wants to put sand 1.05 feet deep in the box. How many cubic feet of sand should Johannas order?

Describe or sketch the space figure formed by rotating the rectangle about the *x*-axis.
a. Indicate the height and radius.
b. Find the volume of the space figure formed.
c. Find the surface area of the space figure formed.

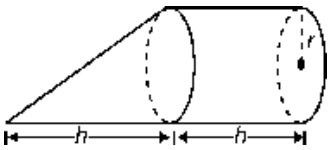
108.



109. The pyramid shown has a rectangular base and faces that are isosceles triangles. Find its volume.



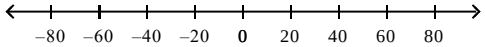
110. A solid consists of a cylinder attached at one base to an off-center cone as shown below. Write a formula for the volume enclosed.



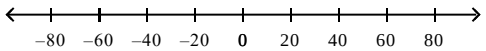
111. Find the median of the data.
40, 54, 9, 48, 37, 81, 16, 38, 29, 30

Solve the inequality. Then graph its solution.

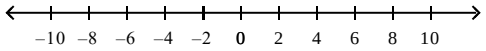
112. $-\frac{x}{7} \leq 8$



113. $-\frac{x}{3} < 8$



114. $-42 > 7k$



115. In how many ways can nine cards be arranged on a shelf?

116. There are 16 students participating in a spelling bee. In how many ways can the students who go first and second be chosen?

117. In how many ways can you choose 4 items from 15 items if the order in which you choose them is important?

Events *A* and *B* are dependent events. Find the missing probability.

118.
$P(A) = 0.3$

$P(B \text{ given } A) =$ _____

$P(A \text{ and } B) = 0.09$

119. A drawer contains 10 red socks, 6 white socks, and 4 blue socks. Without looking, you draw out a sock, return it, and draw out a second sock. What is the probability that the first sock is red and the second sock is white? Round your answer to the nearest hundredth.

120. Two cards are drawn in succession and without replacement from a set of 12 cards. How many sets of two cards are possible?

Find the sum.

121. $2\left(t^3 + 2t - 3\right) + 7\left(-4t^3 + t^2 - t + 1\right)$

Find the difference.

122. $\left(6x^2 - 3x + 2\right) - \left(-6x^2 + x - 1\right)$

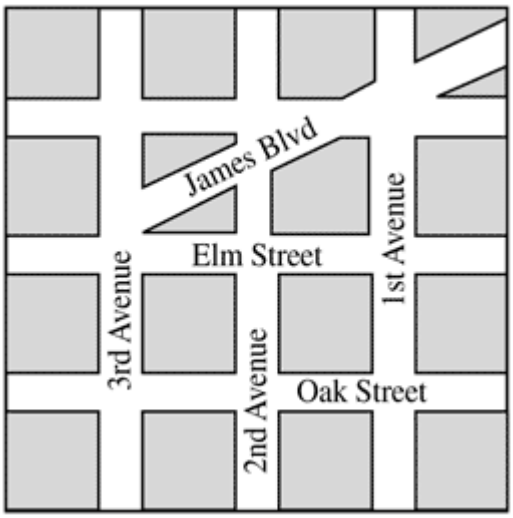
123. $\left(6x^5 + 5x\right) - \left(-8x - 3 - 3x^5\right)$

124. Use the map to answer the following questions.

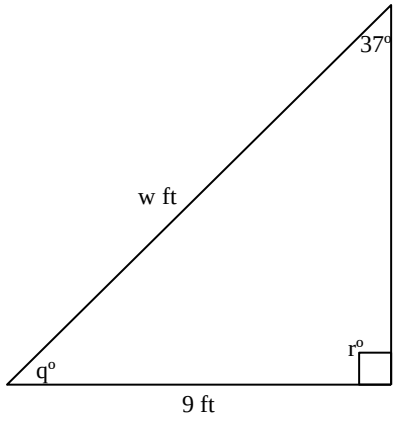
a. Name two streets that are parallel.

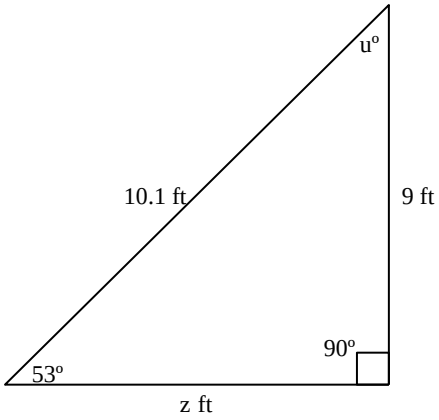
b. Name two streets that are perpendicular.

c. Name two streets that intersect but are not perpendicular.



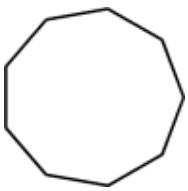
125. The two triangles are congruent. Find the missing side lengths and angle measures.





126. The length and height of a triangle are multiplied by 4. If the perimeter of the original triangle is 8 inches, what is the perimeter of the enlarged triangle?

127. How many triangles are formed by drawing diagonals from one vertex in the polygon? What is the sum of the measures of the angles in the polygon?



128. The distance (in miles) from 7 camper's houses to sleepaway camp is given below. Find the mean, median, and mode of the data set. Round your answers to the nearest tenth if necessary.
17, 1, 15, 10, 20, 13, 1

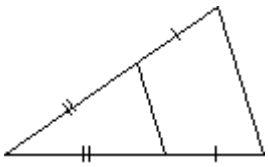
129. Find the variance and standard deviation of the data. Round your answers to the nearest hundredth.
14, 23, 10, 14, 3, 20, 16, 14

130. Two athletes run several miles each day to train. A random sample of their daily distances is taken. Use a calculator to find the mean and standard deviation for each athlete. Use your results to make a conclusion about the data. Round your answers to the nearest hundredth, if necessary.

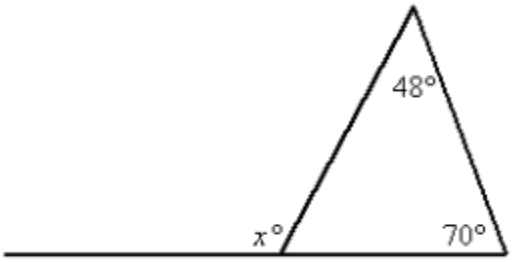
Distances (miles)	
Athlete A	6, 5, 8, 4, 8, 6, 8, 9, 5, 5, 6, 7, 7, 3, 5, 5, 6, 7, 10, 3, 9
Athlete B	9, 8, 8, 8, 4, 4, 4, 5, 5, 6, 15, 1, 3, 8, 4, 4, 8, 6, 10, 10, 10

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

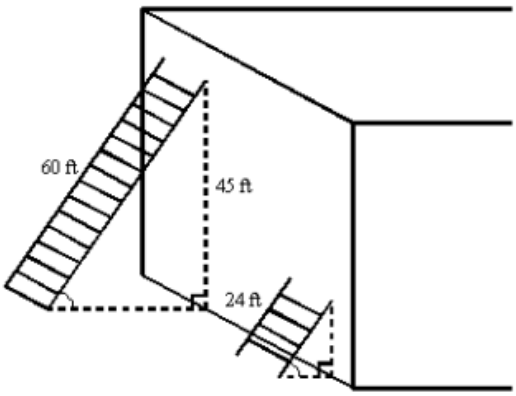
131.



132. Find the value of *x*.



133. Two ladders are leaning against a wall at the same angle as shown.

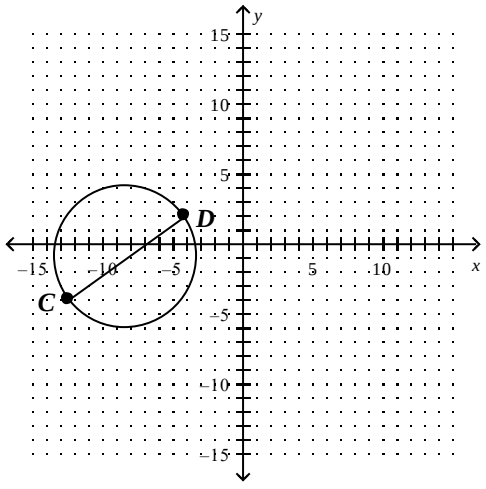


How far up the wall does the shorter ladder reach?

134. The postulate or theorem that can be used to prove that the two triangles are similar is _____.

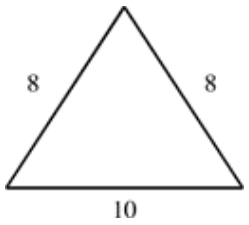
135. Given: $\angle B \cong \angle E$ and $\angle C \cong \angle F$. What other piece of information is needed to show $\Delta ABC \cong \Delta DEF$ by ASA Congruence Postulate?

136. The endpoints of a diameter of a circle are $C(-12, -4)$ and $D(-4, 2)$. What is the *y*-coordinate of the center of the circle?



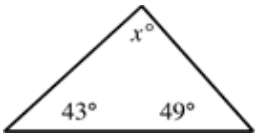
Classify the triangle by its side lengths.

137.



Find the value of *x*. Classify the triangle by its angles.

138.



139. $\triangle ABC$ has vertices $A(1,1)$, $B(1,5)$, and $C(4,5)$. Don transformed the triangle by $(x,y) \rightarrow (2x, 2y)$, Vanessa transformed the triangle by $(x,y) \rightarrow (-x,y)$, and Elise transformed the triangle by $(x,y) \rightarrow (x-3, y+4)$.

a. Sketch $\triangle ABC$ and each student's transformation.
b. What type of transformation did each student perform?
c. Are any of the transformations isometries? If a transformation is an isometry, explain how you can prove it. Otherwise, explain why the transformation is not an isometry.

140. Write a proof. Justify each statement.

Given: $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$

Prove: $\triangle ABD \cong \triangle CDB$