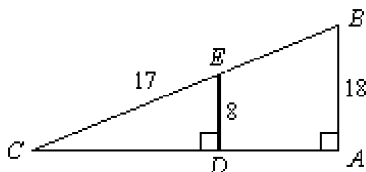


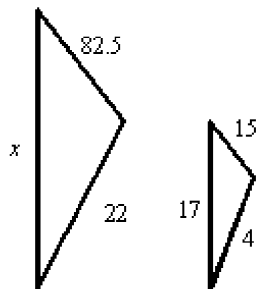
### Geometry Second Semester Final Exam Review

- Mr. Jones has taken a survey of college students and found that 1 out of 6 students are liberal arts majors. If a college has 7000 students, what is the best estimate of the number of students who are liberal arts majors?
  - 1167
  - 117
  - 210
  - 42,000
- Mr. Jones has taken a survey of college students and found that 90 out of 106 students are liberal arts majors. If a college has 7596 students, what is the best estimate of the number of students who are liberal arts majors?
  - 45
  - 8946
  - 64,494
  - 6449

- Given that  $\frac{ED}{BA} = \frac{EC}{BC}$ , find  $BC$  to the nearest tenth. The figure is not drawn to scale.

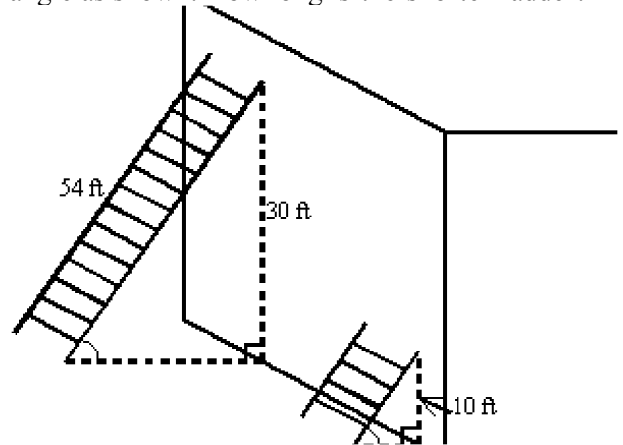


- 40.5
  - 0.2
  - 38.3
  - 21.3
- The triangles below are similar. Find  $x$ .

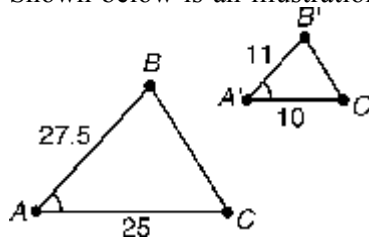


- 3.1
- 93.5
- 24.9
- 99

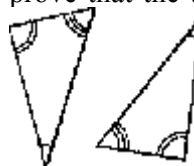
- Two ladders are leaning against a wall at the same angle as shown. How long is the shorter ladder?



- 8 ft
  - 22 ft
  - 18 ft
  - 36 ft
- Shown below is an illustration of the \_\_\_\_\_.

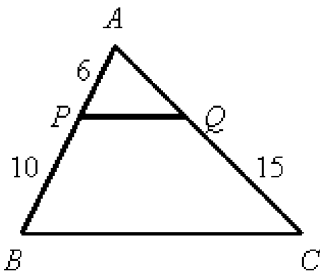


- AA Similarity Postulate
  - SAS Congruence Theorem
  - SSS Similarity Theorem
  - SAS Similarity Theorem
- The postulate or theorem that can be used to prove that the two triangles are similar is \_\_\_\_\_.

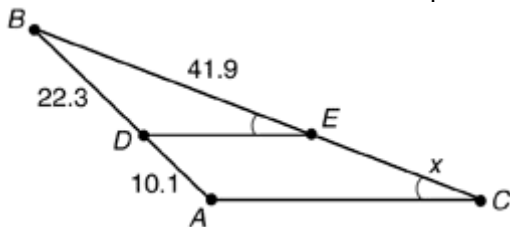


- SAS Similarity Theorem
- ASA Congruence Theorem
- SSS Similarity Theorem
- AA Similarity Postulate

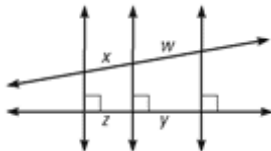
8. Given:  $\overline{PQ} \parallel \overline{BC}$ . Find the length of  $\overline{AQ}$ .



- a. 11  
 b. 9  
 c. 13  
 d. 6
9. Find the value of  $x$  to one decimal place.



- a. 2.2  
 b. 22.5  
 c. 0.5  
 d. 19.0
10. For the figure shown, which statement is *not* true?



- a.  $\frac{w}{y} = \frac{x}{z}$   
 b.  $wx = yz$   
 c.  $wz = xy$   
 d.  $\frac{w}{x} = \frac{y}{z}$

11. Solve:

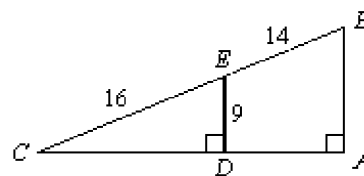
$$\frac{35}{31} = \frac{x}{12}$$

12. Solve the proportion  $\frac{5}{x-1} = \frac{7}{x}$ .

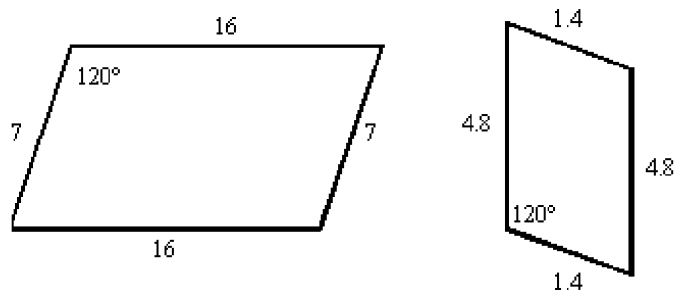
13. Solve the proportion  $\frac{3}{2x} = \frac{7}{5}$ .

14. A survey indicated that 4 out of 6 doctors used brand X aspirin. If 3600 doctors were surveyed, how many used brand X?

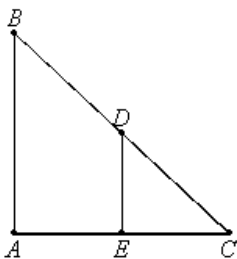
15. Given that  $\frac{ED}{BA} = \frac{EC}{BC}$ , find  $AB$  to the nearest tenth. The figure is not drawn to scale.



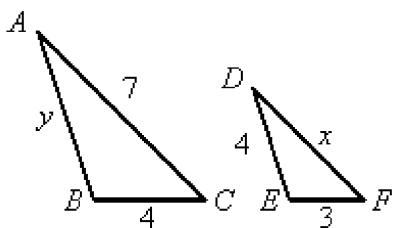
16. Determine whether the figures are similar.



17. In the diagram,  $\triangle ABC$  is similar to  $\triangle EDC$ . Write the statement of proportionality.



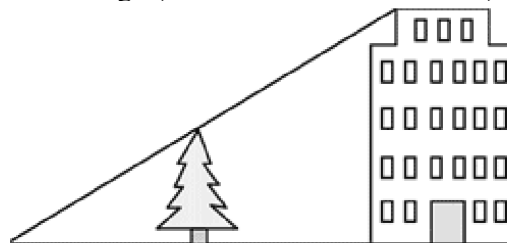
18. Given that  $\triangle ABC \sim \triangle DEF$ , solve for  $x$  and  $y$ .



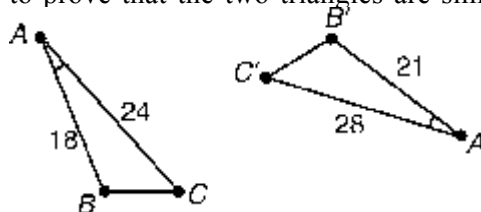
19. A building casts a shadow 200 meters long. At the same time, a pole 4 meters high casts a shadow 20 meters long. What is the height of the building?

20. A building casts a shadow 168 meters long. At the same time, a pole 5 meters high casts a shadow 20 meters long. What is the height of the building?

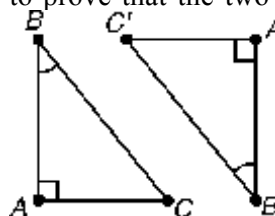
21. Sadie wants to find the height of the tallest building in her city. She stands 130 feet away from the building. There is a tree 37 feet in front of her, which she knows is 17 feet tall. How tall is the building? (Round to the nearest foot.)



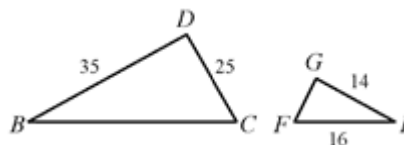
22. State the postulate or theorem that can be used to prove that the two triangles are similar.



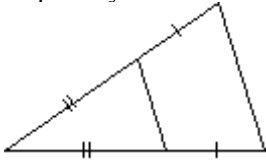
23. State the postulate or theorem that can be used to prove that the two triangles are similar.



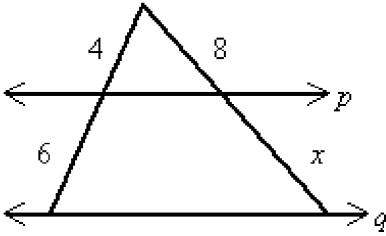
24. Given:  $\triangle BCD \sim \triangle EFG$ . Find the length of  $\overline{BC}$ .



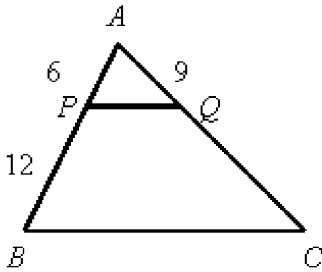
25. Tell whether each pair of triangles is similar. Explain your reasoning.



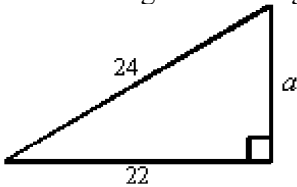
26. If  $p \parallel q$ , solve for  $x$ .



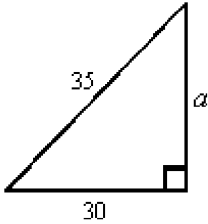
27. Given:  $\overline{PQ} \parallel \overline{BC}$ . Find the length of  $\overline{AC}$ .



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

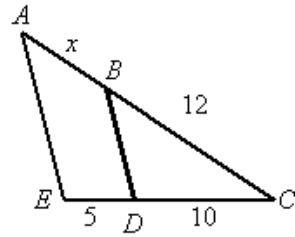


31. Find the length of the leg of this right triangle. Give an approximation to 3 decimal places.

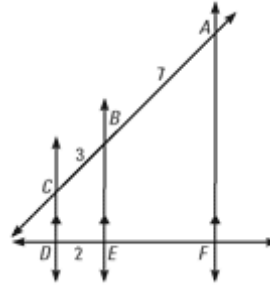


- a. 8.062                      b. 17.748                      c. 46.098                      d. 18.028

28. Given  $\overline{AE} \parallel \overline{BD}$ . Solve for  $x$ .

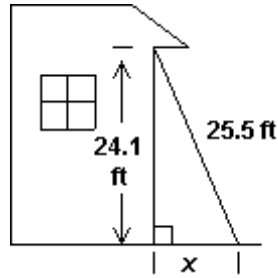


29. Find  $EF$ .



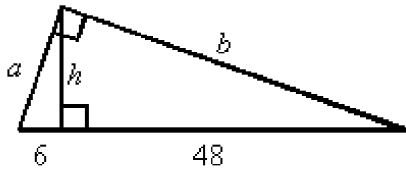
32. How long is a string reaching from the top of a 12-ft pole to a point on the ground that is 6 ft from the bottom of the pole? Give an exact answer and an approximation to 3 decimal places.

33. A 25.5 foot ladder rests against the side of a house at a point 24.1 feet above the ground. The foot of the ladder is  $x$  feet from the house. Find the value of  $x$  to one decimal place.

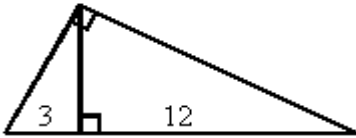


- a. 1.9
- b. 7.0
- c. 8.3
- d. 10.1

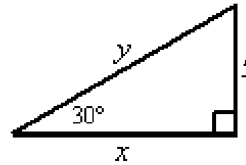
34. Find  $a$ ,  $b$ , and  $h$ .



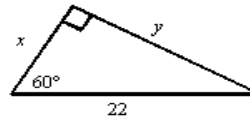
35. Find the length of the altitude drawn to the hypotenuse.



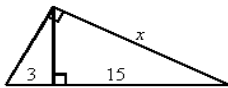
38. Find the value of  $x$  and  $y$ .



39. Find the value of  $x$  and  $y$ .

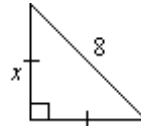


36. Find the value of  $x$ .

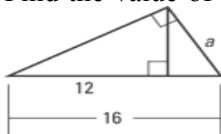


- a.  $3\sqrt{2}$
- b.  $3\sqrt{6}$
- c.  $3\sqrt{5}$
- d.  $3\sqrt{30}$

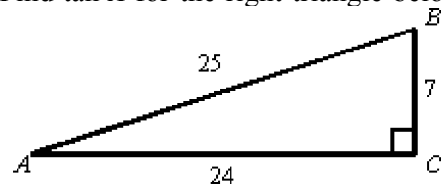
40. Find the value of  $x$ .



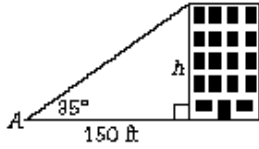
37. Find the value of the variable in the diagram.



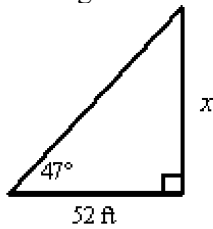
41. Find  $\tan A$  for the right triangle below:



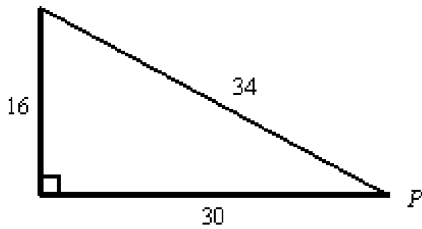
42. Explain how a tangent ratio can be used to find the height of the building in the figure below. Find the height of the building when  $\angle A = 35^\circ$ .



43. A photographer shines a camera light at a particular painting forming an angle of  $47^\circ$  with the camera platform. If the light is 52 feet from the wall where the painting hangs, how high above the platform is the painting?



- a. 0.93 ft      b. 55.76 ft      c. 1.07 ft      d. 48.49 ft
44. Find  $\sin P$ ,  $\cos P$ ,  $\tan P$ .

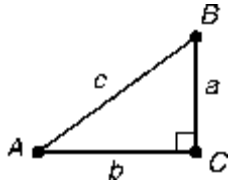


45. Write the trigonometric ratio.

A.  $\sin A$

B.  $\tan B$

C.  $\cos A$



46. To find the height of a tower, a surveyor positions a transit that is 2 meters tall at a spot 40 meters from the base of the tower. She measures the angle of elevation to the top of the tower to be  $46^\circ$ . What is the height of the tower, to the nearest meter?

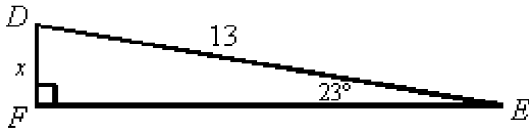
47. A slide 4.4 m long makes an angle of  $33^\circ$  with the ground. How high is the top of the slide above the ground?

- a. 2.53 m  
b. 2.4 m  
c. 3.69 m  
d. 2.86 m

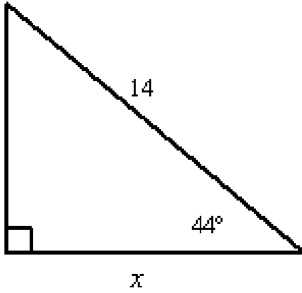
48. Liola drives 19 km up a hill that is at a grade of  $15^\circ$ . What horizontal distance, to the nearest tenth of kilometer, has she covered?

- a. 5.1 km  
b. 4.9 km  
c. 14.2 km  
d. 18.4 km

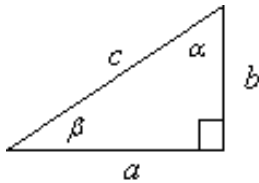
49. Find the value of  $x$ , to the nearest whole number. (not drawn to scale)



50. Find  $x$ , to the nearest hundredth.



51. Solve the right triangle:  $\alpha = 20^\circ$  and  $a = 20$ ; Find  $\beta$ ,  $b$ , and  $c$ .



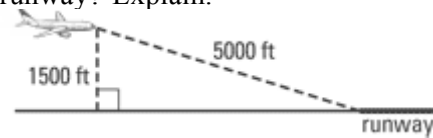
52. Find the missing angle and side measures of  $\triangle ABC$ , given that  $m\angle A = 20^\circ$ ,  $m\angle C = 90^\circ$ , and  $CB = 20$ .

- a.  $m\angle B = 110^\circ$ ,  $c = 58.5$ ,  $b = 55.4$
- b.  $m\angle B = 70^\circ$ ,  $c = 59$ ,  $b = 54.9$
- c.  $m\angle B = 70^\circ$ ,  $c = 58.5$ ,  $b = 54.9$
- d.  $m\angle B = 110^\circ$ ,  $c = 58.5$ ,  $b = 54.9$

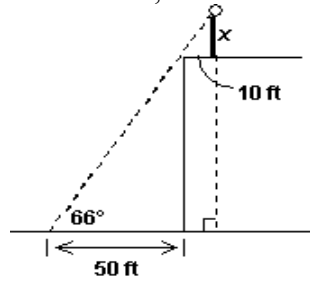
53. Two legs of a right triangle have lengths 15 and 8. The measure of the smaller acute angle is \_\_\_\_\_.

- a.  $\approx 32.2^\circ$
- b.  $\approx 17^\circ$
- c.  $\approx 61.9^\circ$
- d.  $\approx 28.1^\circ$

54. 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.



55. 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  $66^\circ$ . Find  $x$ , the height of the antenna, to the nearest foot.



56. The translation vector is  $\vec{u} = \langle -7, 4 \rangle$ . If the image of  $A$  is  $A' \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ , find the coordinates of point  $A$ .

57. The translation vector is  $\vec{u} = \langle 7, -3 \rangle$ . The image of point  $A$  is  $A' \begin{pmatrix} 5 \\ -7 \end{pmatrix}$ . Find the coordinates of  $A$ .

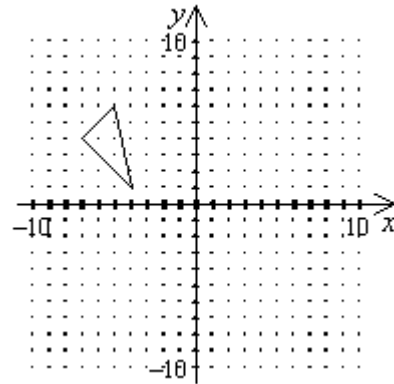
58. The point  $A(-7, 3)$  is translated onto  $A'$  by the vector  $\vec{u} = \langle 5, -4 \rangle$ . The coordinates of  $A'$  are \_\_\_\_\_.

- a.  $(-2, -1)$
- b.  $(-12, 7)$
- c.  $(2, -7)$
- d.  $(5, -4)$

59. The points in a coordinate plane are reflected in the  $y$ -axis. In general, every point  $(x, y)$  is mapped onto what point?

60. The points in a coordinate plane are reflected in the line  $y = x$ . In general, every point  $(x, y)$  is mapped onto what point?

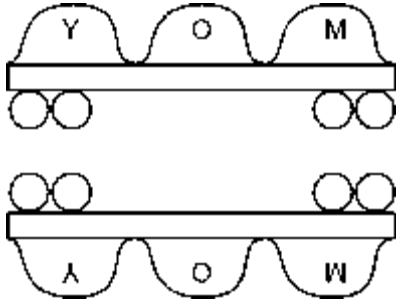
61. Suppose the triangle in the figure below is reflected over the  $y$ -axis. Draw the line of reflection and the image triangle.



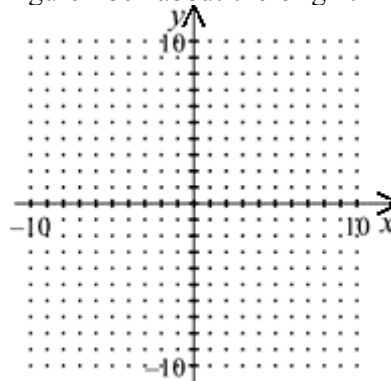
62. Name the transformation.



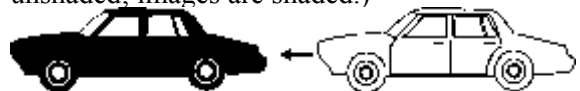
63. Name the transformation.



64. Graph the figure with vertices  $E(4, -4)$ ,  $E(2, -2)$ ,  $E(-1, -5)$ , and  $E(1, -7)$ . Rotate the figure  $180^\circ$  about the origin.

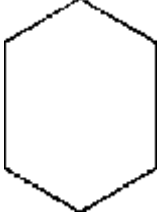


65. Name the transformation. (Preimages are unshaded; images are shaded.)

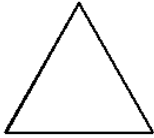




66. The hexagon shown below is equiangular. How many lines of symmetry does it have?



- a. 2  
 b. 1  
 c. 3  
 d. 6
67. For the figure below, draw all the lines of symmetry. If there are none, write "none."



68. Which of the following letters (if drawn as simply as possible) has at least one line of symmetry?  
**Q, S, T, Z**

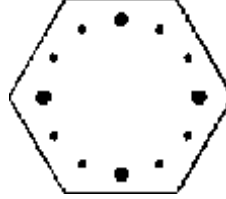
- a. **S**  
 b. **T**  
 c. **Q**  
 d. **Z**

69. How many lines of symmetry does a regular hexagon have? Sketch the symmetry lines on the figure below.

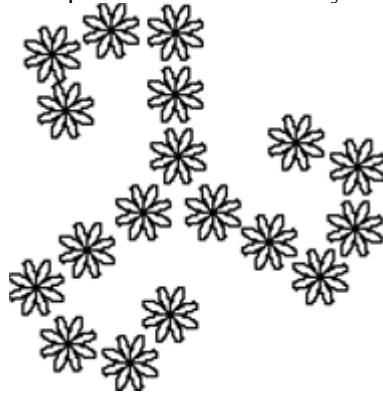


70. How many lines of symmetry does an isosceles right triangle have? Draw a diagram to illustrate.

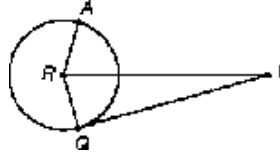
71. Does the clock face below have any rotational symmetry? If so, list any angles of rotation,  $180^\circ$  or less, that can map it onto itself.



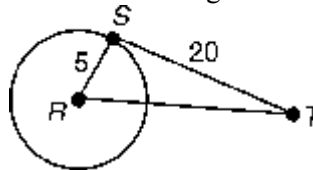
72. Tell whether the figure has rotational symmetry. If so, give each angle and direction of rotation that produces rotational symmetry.



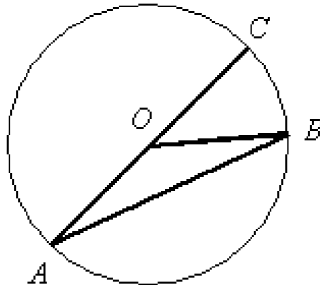
73. Given  $RP = 22$ ,  $RA = 6$ , and  $\overline{PQ}$  is tangent to  $\tilde{n}R$  at  $Q$ , find  $PQ$ .



74. Given  $\overline{ST}$  is tangent to  $\tilde{n}R$  at  $S$ , find  $RT$ .

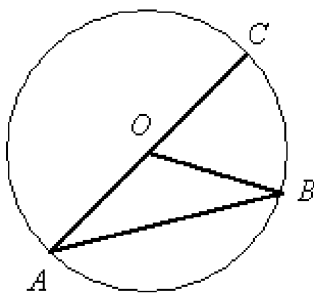


75. Given: In  $\odot O$ ,  $m\widehat{BAC} = 320^\circ$ . Find  $m\angle A$ .



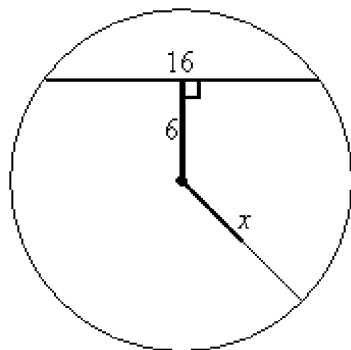
- a.  $26^\circ$
- b.  $13^\circ$
- c.  $20^\circ$
- d.  $10^\circ$

76. Given: In  $\odot O$ ,  $m\widehat{BAC} = 298^\circ$ . Find  $m\angle B$ .



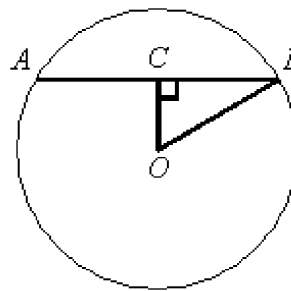
- a.  $37^\circ$
- b.  $31^\circ$
- c.  $15.5^\circ$
- d.  $18.5^\circ$

77. Find the value of  $x$ .

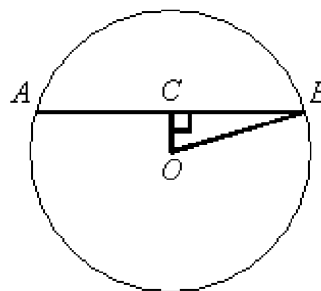


- a. 10.0
- b. 14.8
- c. 11.3
- d. 17.1

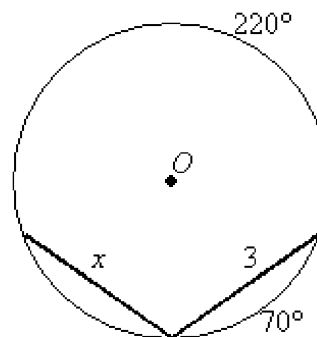
78. Given circle  $O$  with radius 34 and  $OC = 16$ . Find the length of  $\overline{AB}$ .



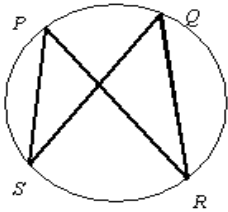
79. Given circle  $O$  with radius 25 and  $OC = 7$ . Find the length of  $\overline{AB}$ .



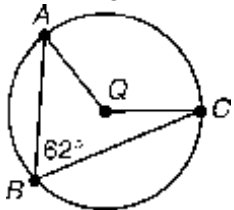
80. Find the value of  $x$  to the nearest tenth.



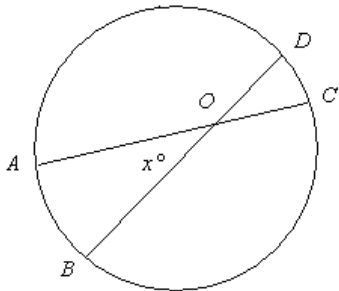
81. Find  $m\angle PSQ$  if  $m\angle PSQ = 3y - 5$  and  $m\angle PRQ = 2y + 15$ .



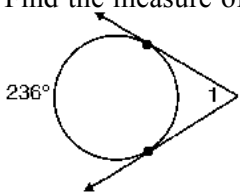
- a.  $27.5^\circ$   
 b.  $20^\circ$   
 c.  $55^\circ$   
 d.  $35^\circ$
82. Given  $\widehat{m}Q$  and  $m\angle B = 62^\circ$ , find  $m\widehat{AC}$ .



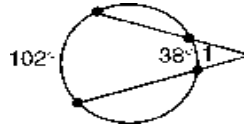
- a.  $62^\circ$   
 b.  $124^\circ$   
 c.  $236^\circ$   
 d.  $248^\circ$
83. Find the value of  $x$  if  $m\widehat{AB} = 20^\circ$  and  $m\widehat{CD} = 62^\circ$ .



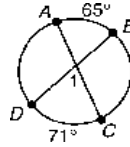
- a.  $41^\circ$   
 b.  $21^\circ$   
 c.  $43^\circ$   
 d.  $20.5^\circ$
84. Find the measure of  $\angle 1$ .



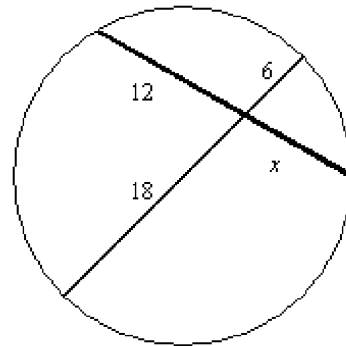
85. Find the measure of  $\angle 1$ .



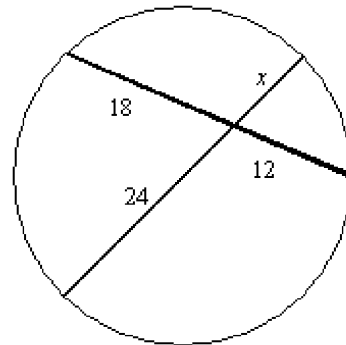
86. Find the measure of  $\angle 1$ .



87. Find the value of  $x$ .

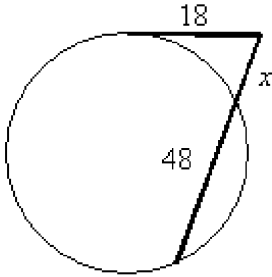


- a. 18  
 b. 12  
 c. 6  
 d. 9
88. Find the value of  $x$ .



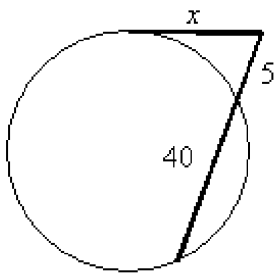
- a. 24  
 b. 12  
 c. 18  
 d. 9

89. Find the value of  $x$ .



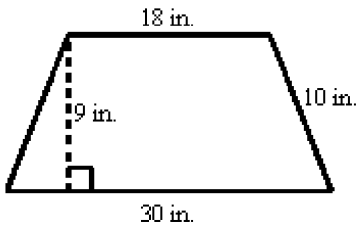
- a. 8
- b. 6
- c. 3
- d. none of these

90. Find the value of  $x$ .

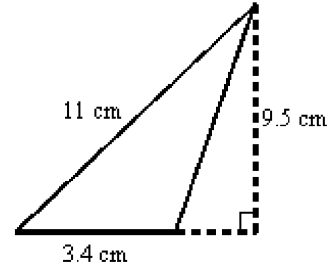


- a. 15
- b. 8
- c. none of these
- d. 35

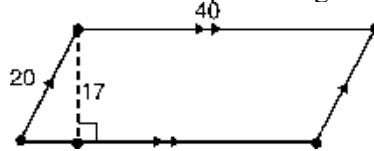
94. Find the area:



91. Find the area (not drawn to scale):

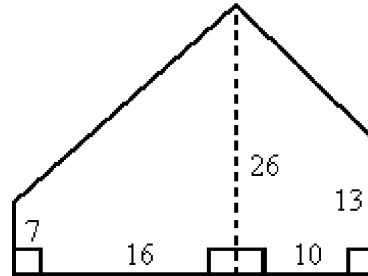


92. The area of the parallelogram is \_\_\_\_\_.

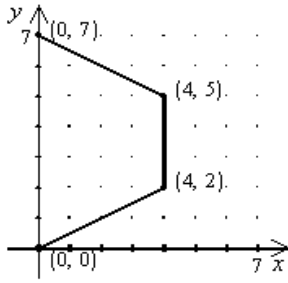


- a. 680 sq. units
- b. 800 sq. units
- c.  $40\sqrt{111}$  sq. units
- d. 340 sq. units

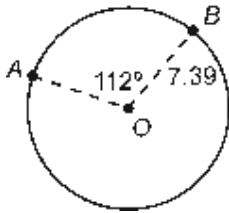
93. Find the area of the region shown by dividing it into two trapezoids.



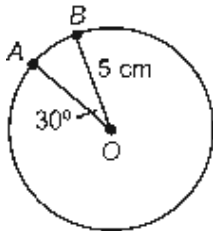
95. Find the area of the quadrilateral.



96. Circle  $O$  has a radius of 7.39. If  $m\angle AOB$  is  $112^\circ$ , then find the length of  $\widehat{AB}$  to one decimal place.



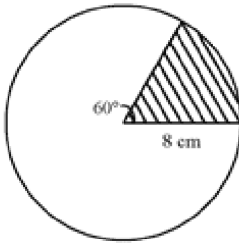
97. Find the arc length of  $\widehat{AB}$  to two decimal places.



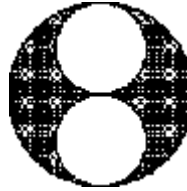
98. Find the area of the shaded region. (Assume that the ends of the figure are semicircles.)



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

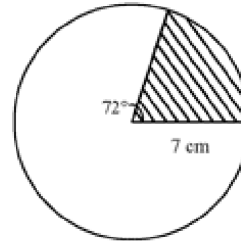


100. Each circle is tangent to the other two. If the diameter of the large circle is 12, the area of the shaded region is \_\_\_\_\_.



- a.  $9\pi$  sq. units
- b.  $36\pi$  sq. units
- c.  $18\pi$  sq. units
- d.  $24\pi$  sq. units

101. Find the area of the shaded region.

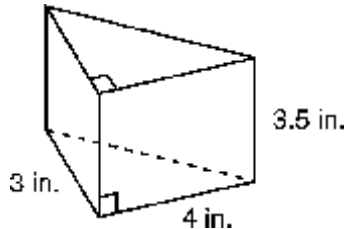


- a.  $123.15 \text{ cm}^2$
- b.  $38.48 \text{ cm}^2$
- c.  $153.94 \text{ cm}^2$
- d.  $30.79 \text{ cm}^2$

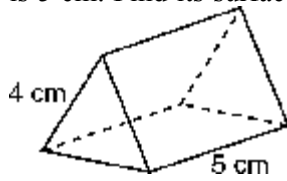
102. Find the area of a regular heptagon with side length 10 cm.

- a.  $363.4 \text{ cm}^2$
- b.  $346.7 \text{ cm}^2$
- c.  $403.3 \text{ cm}^2$
- d.  $726.8 \text{ cm}^2$

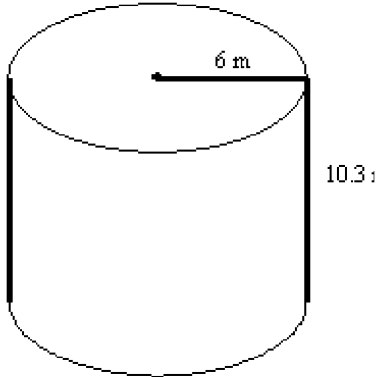
103. Find the surface area of the right prism below.



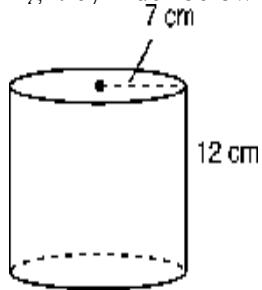
104. The right prism below has bases which are equilateral triangles of side length 4 cm. Its height is 5 cm. Find its surface area.



105. Find the surface area of the cylinder to the nearest square unit. Use  $\pi \approx 3.14$ .

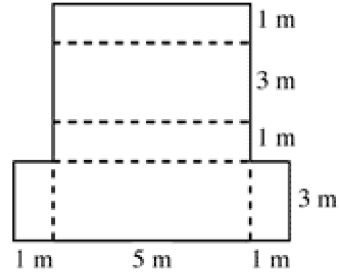


- a.  $98 \text{ m}^2$   
 b.  $307 \text{ m}^2$   
 c.  $62 \text{ m}^2$   
 d.  $614 \text{ m}^2$
106. The surface area, in square centimeters, of the right cylinder below is \_\_\_\_\_.

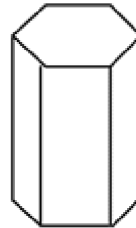


- a.  $7^2 \pi + 14\pi(12) = 217\pi$   
 b.  $14\pi(12) = 168\pi$   
 c.  $98\pi + (14\pi)12 = 266\pi$   
 d.  $7^2 \pi(12) = 588\pi$

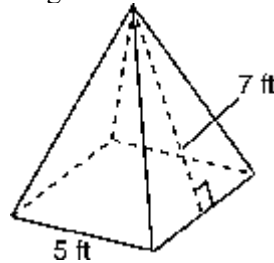
107. Name the three dimensional solid which can be formed by this net.



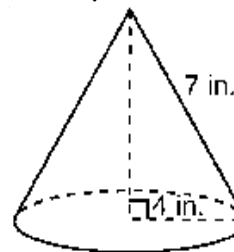
- a. Triangular Prism  
 b. Rectangular Prism  
 c. Triangular Pyramid  
 d. Rectangular Pyramid
108. Sketch a net for the solid.



109. The pyramid shown has a square base and a slant height of 7 ft. Find its surface area.

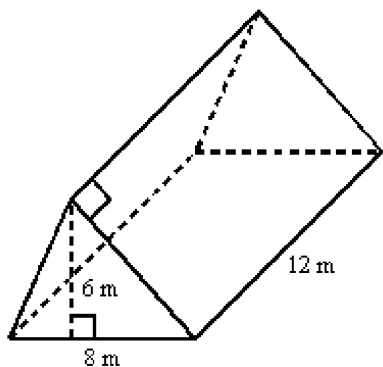


110. The surface area of the right cone shown is



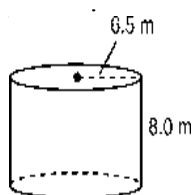
- a.  $44\pi \text{ in.}^2$   
 b.  $112\pi \text{ in.}^2$   
 c.  $16\sqrt{33}\pi \text{ in.}^2$   
 d.  $36\pi \text{ in.}^2$

111. Find the volume of the right triangular prism.



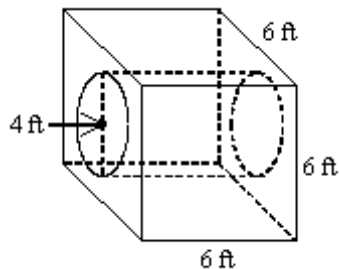
- a.  $60 \text{ m}^3$
- b.  $288 \text{ m}^3$
- c.  $576 \text{ m}^3$
- d.  $36 \text{ m}^3$

112. The volume of the right circular cylinder is about



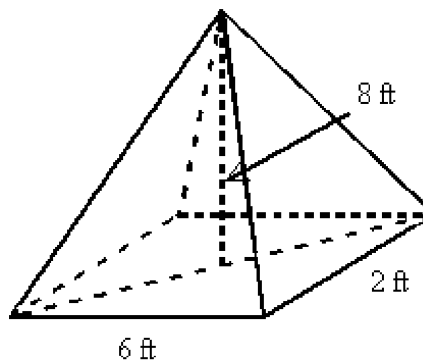
- a.  $265.5 \text{ m}^3$
- b.  $326.7 \text{ m}^3$
- c.  $1036.9 \text{ m}^3$
- d.  $1061.9 \text{ m}^3$

113. A concrete block has a cylindrical hole 4 feet in diameter drilled through it to allow a pipe to pass through. How many cubic feet of concrete are left in the block? Use 3.14 as an approximation for  $\pi$  and round your answer to the nearest tenth.

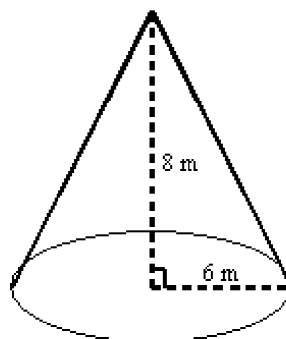


- a. 90.0 cubic feet
- b. 85.4 cubic feet
- c. 140.6 cubic feet
- d. 203.4 cubic feet

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

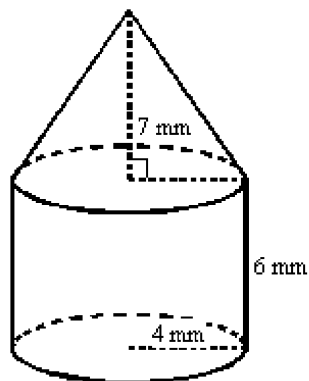


115. Calculate the volume of the cone. Use  $\pi \approx 3.14$ .



- a.  $301.44 \text{ m}^3$
- b.  $904.32 \text{ m}^3$
- c.  $37.68 \text{ m}^3$
- d.  $96 \text{ m}^3$

116. Find the volume of the figure to the nearest tenth.



117. What is the volume of a sphere with diameter 9.4 feet?

- a.  $434.9 \text{ ft}^3$
- b.  $277.6 \text{ ft}^3$
- c.  $69.4 \text{ ft}^3$
- d.  $92.5 \text{ ft}^3$



**Geometry Second Semester Final Exam Review  
Answer Section**

1. A
2. D
3. C
4. B
5. C
6. D
7. D
8. B
9. D
10. B
11.  $13\frac{17}{31}$
12.  $x = \frac{7}{2}$
13.  $x = \frac{15}{14}$
14. 2400 used brand X
15. 16.9
16. The figures are not similar.
17.  $\frac{EC}{AC} = \frac{DC}{BC} = \frac{DE}{BA}$
18.  $x = 5.25, y = 5.33$
19. 40 meters
20. 42 meters
21. 60 ft
22. SAS Similarity Theorem
23. AA Similarity Postulate
24. 40
25. Yes; SAS Similarity Theorem
26. 12
27. 27
28. 6
29.  $\frac{14}{3}$
30. 9.592
31. D
32.  $\sqrt{180}$  ft; 13.416 ft
33. C
34.  $a = 18, b = 36\sqrt{2}, h = 12\sqrt{2}$
35. 6
36. D
37.  $a = 8$

38.  $x = 5\sqrt{3}, y = 10$

39.  $x = 11, y = 11\sqrt{3}$

40.  $x = 4\sqrt{2}$

41.  $\frac{7}{24}$

42. Using the tangent ratio  $\tan A = \frac{\text{leg opposite } \angle A}{\text{leg adjacent to } \angle A}$ ,  $\tan 35^\circ = \frac{h}{150}$ . So  $h = 150 \tan 35^\circ \approx 150(0.7)$ , or about 105 ft.

43. B

44.  $\sin P = \frac{8}{17}, \cos P = \frac{15}{17}, \tan P = \frac{8}{15}$

45. A.  $\frac{a}{c}$  B.  $\frac{b}{a}$  C.  $\frac{b}{c}$

46. 43 m

47. B

48. D

49. 5

50. 10.07

$\beta = 70^\circ$

51.  $b \approx 54.95$

$c \approx 58.48$

52. C

53. D

54. About  $72.5^\circ$ .  $\cos x = \frac{1500}{5000}$  so  $x = \cos^{-1} \frac{1500}{5000} \approx 72.5^\circ$

55.  $x \approx 35$  ft

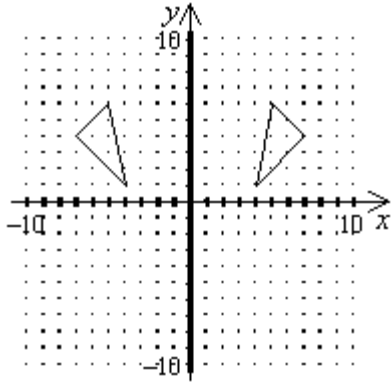
56. (13, -8)

57. (-2, -4)

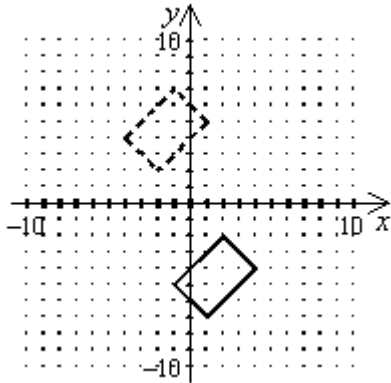
58. A

59.  $(-x, y)$

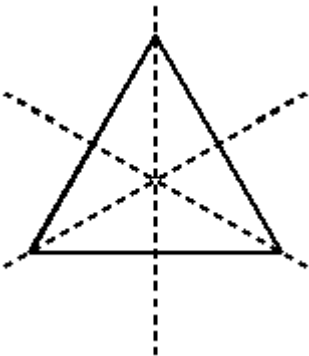
60.  $(y, x)$



- 61.
- 62. Reflection
- 63. Reflection



- 64.
- 65. Translation
- 66. A

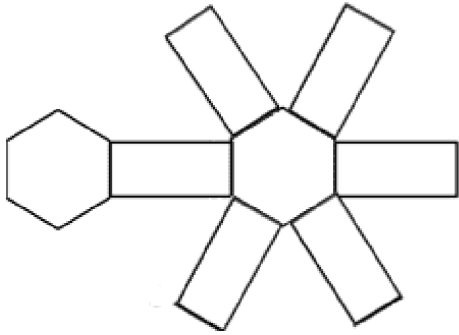


- 67.
- 68. B
- 69. 6



- 70. 1; diagrams should show the line of symmetry from the midpoint of the hypotenuse to the opposite vertex.
- 71. Yes,  $180^\circ$ .
- 72. yes;  $120^\circ$  in either direction

73.  $\sqrt{448} = 8\sqrt{7} \approx 21.2$
74.  $\sqrt{425} = 5\sqrt{17} \approx 20.6$
75. C
76. B
77. A
78. 60
79. 48
80. 3
81. C
82. B
83. A
84.  $56^\circ$
85.  $32^\circ$
86.  $68^\circ$
87. D
88. D
89. B
90. A
91.  $16.15 \text{ cm}^2$
92. A
93. 459 sq. units
94.  $216 \text{ in.}^2$
95. 20 sq. units
96. 14.4 units
97. 2.62 cm
98.  $\approx 322 \text{ sq. units}$
99.  $33.49 \text{ cm}^2$
100. C
101. D
102. A
103.  $54 \text{ in.}^2$
104.  $\hat{E}$   
 $\hat{A} 60 + 8\sqrt{3} \text{ cm}^2 \approx 73.9 \text{ cm}^2$   
 $\hat{E}$
105. D
106. C
107. B



- 108.
- 109.  $95 \text{ ft}^2$
- 110. A
- 111. B
- 112. D
- 113. C
- 114.  $32 \text{ ft}^3$
- 115. A
- 116.  $418.9 \text{ mm}^3$
- 117. A