Geometry Review for Final Exam

____ 1. Find the values of x and y.
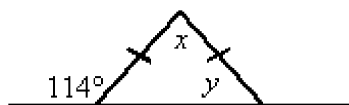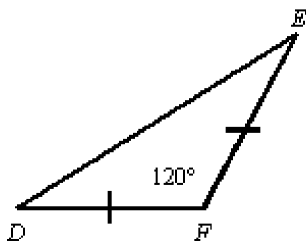

     a. $x = 66°, y = 46°$
     b. $x = 66°, y = 114°$

     c. $x = 48°, y = 114°$
     d. $x = 48°, y = 66°$

____ 2. Given $m\angle WXY = m\angle WYX$; $WX = 4n + 2$; $WY = 8n - 2$; $XY = 6$; find WX.
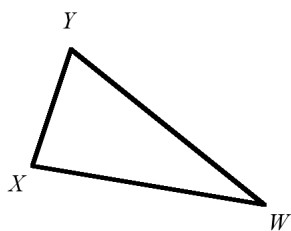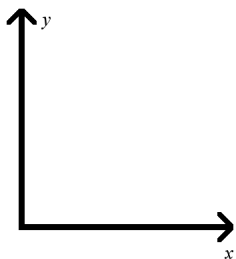

     a. $WX = 6$

     b. $WX = 26$

     c. $WX = \dfrac{9}{2}$

     d. $WX = 1$

3. Use information in the figure below to find $m\angle D$.

4. Place a right triangle in a convenient position in the first quadrant of a coordinate plane. Label each vertex using variables for each of the coordinates. Be sure to use the fewest possible variables.
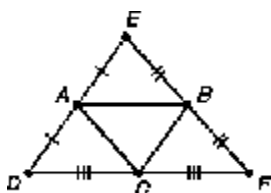

5. How many midsegments does a triangle have?

6. Solve for x given $BD = 3x + 3$ and $AE = 4x + 8$. Assume B is the midpoint of $\overline{AC}$ and D is the midpoint of $\overline{CE}$.
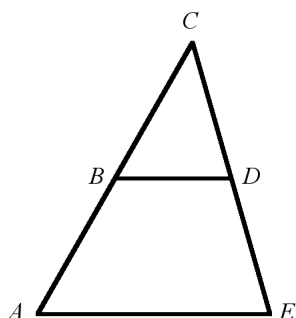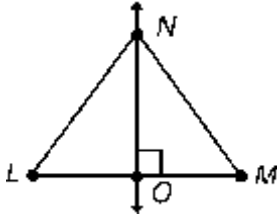

7. For the given triangle, state the relationships between $\overline{AB}$ and $\overline{DF}$.

8. The circumcenter of a triangle is equidistant from the three _____ of the triangle.

9. $\overleftrightarrow{NO}$ is the perpendicular bisector of $\overline{LM}$. If $OM = 4$ and $LN = 6$, then $LO =$_____ and $MN =$_____.
Explain your solutions.

10. The perpendicular bisectors of a triangle all pass through what point?

11. The angle bisectors of a triangle are concurrent at a point called the _____.

12. The incenter of a triangle is equidistant from the three _____ of the triangle.

13. Given: $\overrightarrow{SQ}$ bisects $\angle RST$. Find QR if $UT = 35$ and $UQ = 120$. (not drawn to scale)
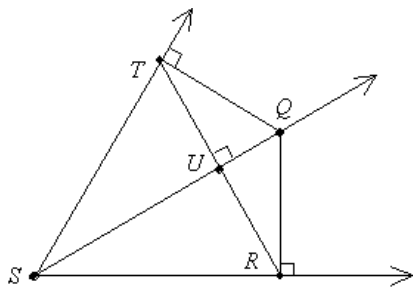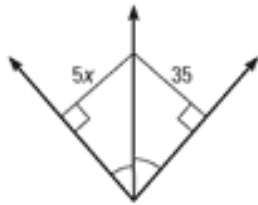
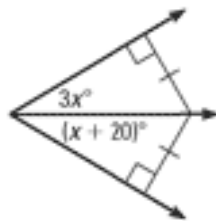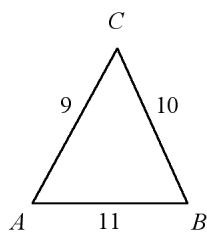**Find the value of x.**

14.

15.

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

17. Identify the largest angle of $\triangle ABC$.

18. Is it possible for a triangle to have sides with the given lengths?
     19 cm, 13 cm, 14 cm

19. 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.

20. Two sides of a triangle have lengths 8 and 11. What are the possible lengths of the third side x?

Solve:

21. $\dfrac{11}{26} = \dfrac{x}{15}$

22. Solve the proportion $\dfrac{5}{x-1} = \dfrac{7}{x}$.

23. A survey indicated that 5 out of 8 doctors used brand X aspirin. If 4000 doctors were surveyed, how many used brand X?

24. The official width-to-length ratio of the United States flag is 1:1.9. If a United States flag is 9.5 feet long, how wide should it be?

25. Find the geometric mean of 6 and 24.

26. A board 24 inches long is cut into two pieces in the ratio 1:2. Find the length of each piece.

27. While visiting a daycare center, you estimate the ratio of toddlers to infants as $3:2$. If the center has an enrollment of 30 children, about how many of them are infants?

28. The measures of the angles of a triangle are in the extended ratio of $7 : 9 : 10$. Find the measures of the angles of the triangle.

29. Given that $\dfrac{ED}{BA} = \dfrac{EC}{BC}$, find AB to the nearest tenth. The figure is not drawn to scale.
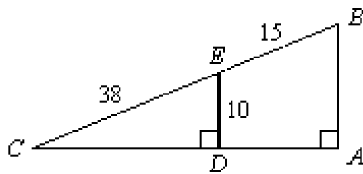
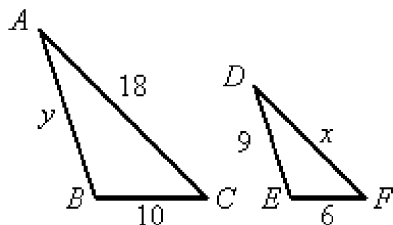30. Find the perimeter of the actual object using the scale factor shown on the blueprint.

3 cm - all sides

1 cm : 4 m
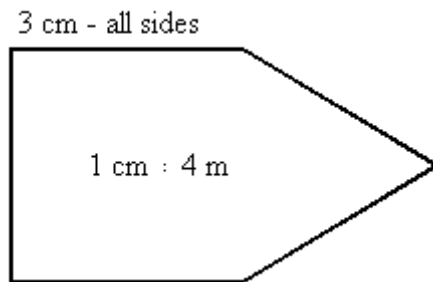
31. $\triangle ABC$ and $\triangle EFG$ are similar with $m\angle A = m\angle E$ and $m\angle B = m\angle F$. If AB, BC, and AC are 3 inches, 5 inches, and 6 inches respectively, and EF is 4.3 inches, find EG.
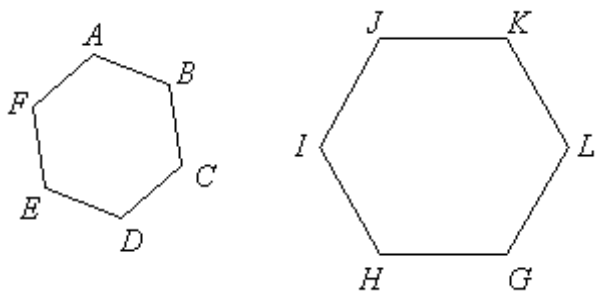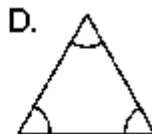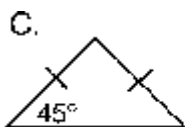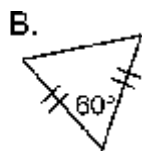
32. Given that $\triangle ABC \sim \triangle DEF$, solve for x and y.

33. 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 $CD = 9$.


34. The perimeter of $\triangle PQR$ is 112, $PQ = 42$, $\triangle PQR \sim \triangle STU$, and $ST = 36$. What is the perimeter of $\triangle STU$?

35. Which triangle below is not similar to any of the others?
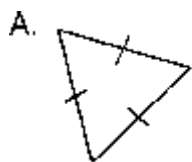
36. A building casts a shadow 174 meters long. At the same time, a pole 5 meters high casts a shadow 15 meters long. What is the height of the building?

37. 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.)
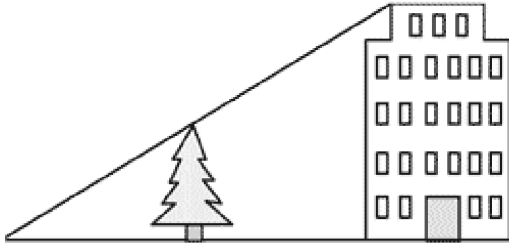
Tell whether each pair of triangles is similar. Explain your reasoning.

38.
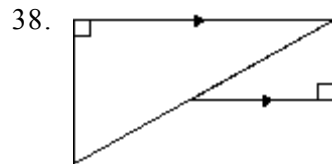
Determine whether the triangles are similar. If the are, write a similarity statement.

39.

40.
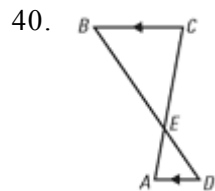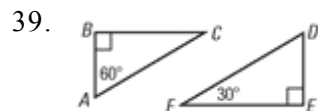
41. State the postulate or theorem that can be used to prove that the two triangles are similar.

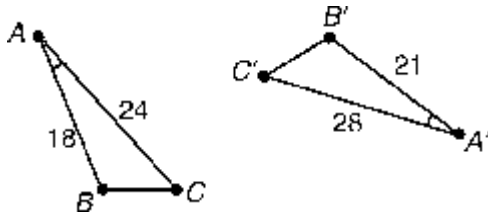42. State the postulate or theorem that can be used to prove that the two triangles are similar.
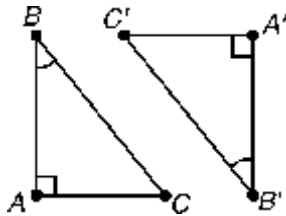
43. If $p \parallel q$, solve for x.
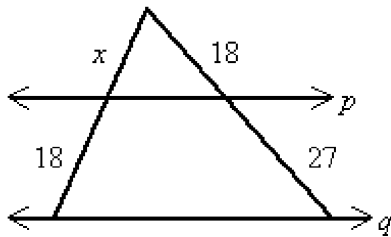
44. In the figure shown, $\overline{BC} \parallel \overline{DE}$, $AB = 2$ yards, $BC = 7$ yards, $AE = 18$ yards, and $DE = 21$ yards. Find CE.

45. Given: $\overline{PQ} \parallel \overline{BC}$. Find the length of $\overline{AB}$.

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

47. Find the length of the leg of this right triangle. Give an approximation to 3 decimal places.
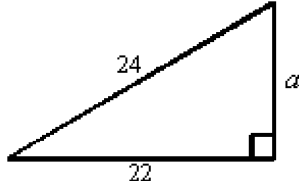
48. How long is a string reaching from the top of a 20-ft pole to a point on the ground that is 10 ft from the bottom of the pole? Give an exact answer and an approximation to 3 decimal places.
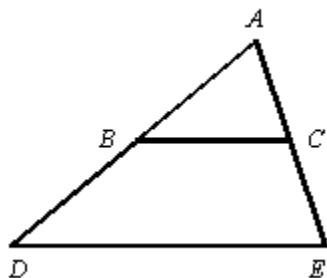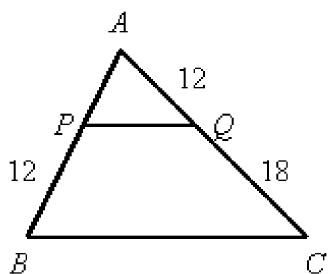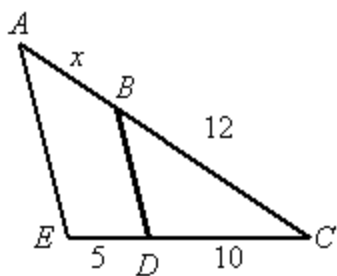
49. A boat traveled in a straight line through calm seas until it was 43 kilometers west and 41 kilometers south of its original position. Find how far the boat traveled, to the nearest tenth of a kilometer.

50. Find the area of the isosceles triangle with side lengths 17 meters, 17 meters, and 30 meters.

51. A triangle has side lengths of 6, 9, and 11. Decide whether it is an acute, right, or obtuse triangle. Explain.

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

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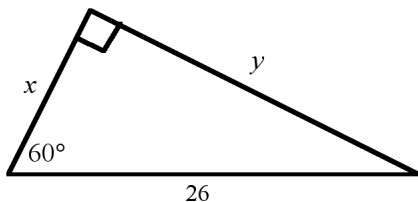
54. A baseball "diamond" is a square with a side length of 90 feet. How far is the throw from third base to first base? (Round your answer to one decimal place.)

55. Find the value of x.

Writing:

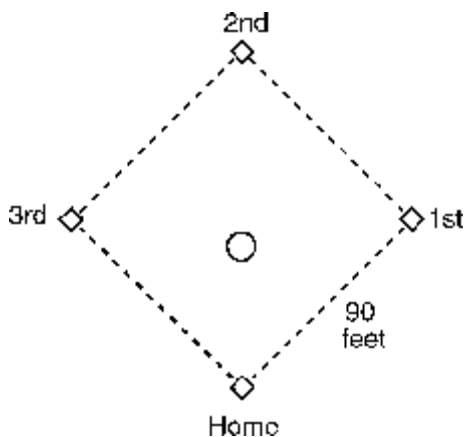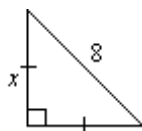56. Explain how a tangent ratio can be used to find the height of the building in the figure below. Find the height of the building when $\angle A = 35°$.
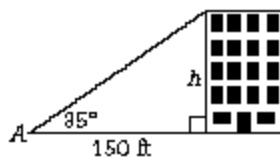
57. Write sin A.
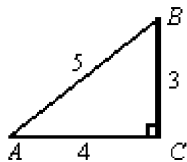
58. Use a calculator to find the value of cos 41° to four decimal places.

59. 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°. What is the height of the tower, to the nearest meter?

60. Find the value of x, to the nearest whole number. (not drawn to scale)
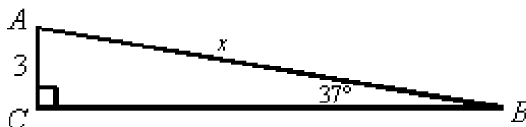
61. A 220 ft string attached to a kite makes a $30°$ angle with the ground. What is the height of the kite to the nearest tenth?

62. A parasailing company uses a 50-foot cable to connect the parasail to the back of the boat. About how far is the parasail from the water when the cable has a 35° angle of elevation? Explain how you got your answer.
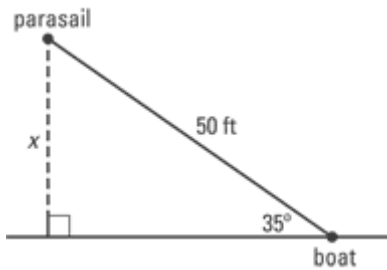
63. Find *AM* in the parallelogram if $PN = 10$ and $MO = 19$.
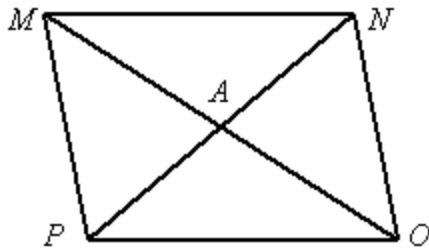
True or False:

64. If a quadrilateral is a parallelogram, then consecutive angles are complementary.

65. If a quadrilateral is a parallelogram, then opposite angles are complementary.

66. Use Euler's Theorem to calculate how many faces a polyhedron has if it has 30 edges and 12 vertices.

67. The base of a pyramid is a regular pentagon and each of its other faces is an equilateral triangle.

    a. How many faces does the pyramid have?
    b. How many edges does the pyramid have?
    c. How many vertices does the pyramid have?

68. A planar cross section that is perpendicular to both bases of a right circular cylinder is a rectangle. What is the shape of a planar cross section that is parallel to the bases of the same cylinder?

69. What is the sum of the number of faces, the number of vertices and the number of edges in a square pyramid?
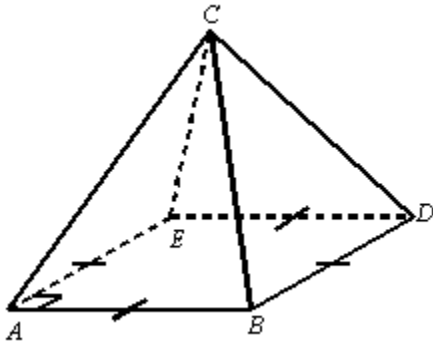
70. A polyhedron has 6 faces and 7 vertices. How many edges does it have? Explain your answer.

71. Find the volume of the rectangular prism.
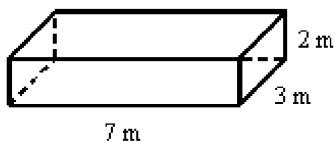
72. Find the volume of a cylinder with height 9.7 km and diameter 20 km. Use $\pi \approx 3.14$.

73. Find the volume of the right prism.
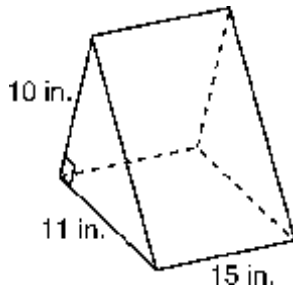
74. Find the volume of the cylinder. (Round the result to one decimal place.)
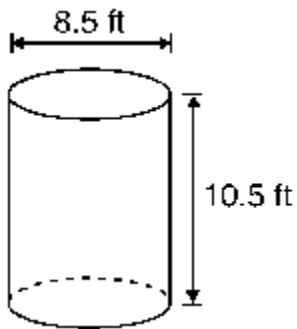
75. The pyramid shown has a rectangular base and faces that are isosceles triangles. Find its volume.

5 ft

6 ft

8 ft
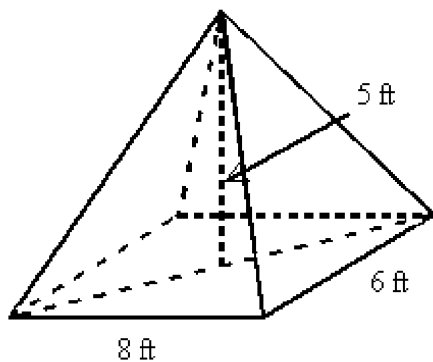
76. Calculate the volume of a cone with height 5 feet and radius 6 feet. Express in terms of π.

77. Find the volume of a right cone with slant height of 97 cm and radius of 65 cm. Express in terms of π.

Find the volume of the figure to the nearest tenth.

78.

7 mm

5 mm

3 mm
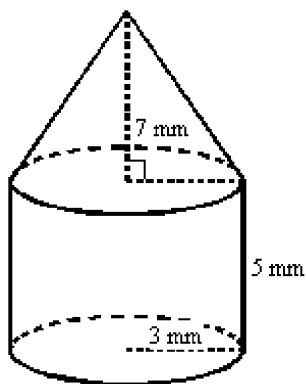
79. The volume of a cone is $256\pi \, \text{in}^3$ and the height is 12 inches. Find the radius.

80. Find the diameter of a sphere that has a surface area of $169\pi \, \text{in}^2$.

81. Find the surface area to the nearest tenth of a square inch of a sphere that has a radius of 17.3 inches.

82. Find the volume of a sphere with a radius of 17.3 inches in cubic feet to the nearest tenth of a cubic foot.

Geometry Review for Final Exam
Answer Section

1. D
2. A
3. 30°
4. Answers may vary. Sample answer: $(r, 0)$ and $(0, s)$

5. 3
6. 1
7. $\overline{AB} \parallel \overline{DF}$ and $AB = \dfrac{1}{2} DF$
8. Vertices
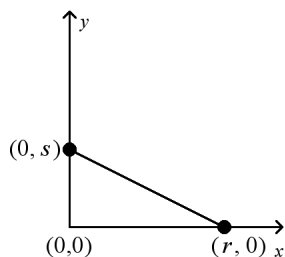9. $LO = 4$, $MN = 6$; $LO = OM$ by definition of bisector and $MN = LN$ by the Perpendicular Bisector Theorem.
10. Circumcenter
11. Incenter
12. Sides
13. 125
14. 7
15. 10
16. Orthocenter
17. $\angle C$
18. yes
19. No
20. $3 < x < 19$
21. $6\dfrac{9}{26}$
22. $x = \dfrac{7}{2}$
23. 2500 used brand X
24. 5 ft
25. 12
26. 8 in., 16 in.
27. about 12
28. $35°, 45°, 100°$
29. 13.9
30. 60 m
31. 8.6 in.

32. $x = 10.8$, $y = 15$
33. 7
34. 96
35. C
36. 58 meters
37. 232 ft
38. Yes; The two right angles are congruent, and since parallel lines are given the alternate interior angles are congruent, so the triangles are similar by the AA Similarity Postulate
39. Similar; $\triangle ABC \sim \triangle DEF$
40. Similar; $\triangle EBC \sim \triangle EDA$
41. SAS Similarity Theorem
42. AA Similarity Postulate
43. 12
44. 12 yd
45. 20
46. 6
47. 9.592
48. $\sqrt{500}$ ft; 22.361 ft
49. 59.4 kilometers
50. $120 \, \text{m}^2$
51. Since $6^2 + 9^2 < 11^2$, it is an obtuse triangle.
52. It is an acute triangle.
53. $x = 13$, $y = 13\sqrt{3}$
54. 127.3 ft
55. $x = 4\sqrt{2}$
56. Using the tangent ratio $\tan A = \dfrac{\text{leg opposite } \angle A}{\text{leg adjacent to } \angle A}$, $\tan 35° = \dfrac{h}{150}$. So $h = 150\left(\tan 35°\right) \approx 150(0.7)$, or about 105 ft.
57. $\dfrac{3}{5}$
58. 0.7547
59. 43 m
60. 5
61. 110.0 ft
62. About 28.7 ft. Let x represent the distance from the parasail to the water. $\sin 35° = \dfrac{x}{50}$ so
$x = 50\sin 35° \approx 28.7$.
63. 9.5
64. False
65. False
66. 20
67. a. 6
   b. 10
   c. 6

68. a circle
69. 18
70. $E = 11$; 11, because $F + V = E + 2$ and $6 + 7 = 11 + 2$.
71. 42 m^3
72. 3045.80 km^3
73. 825 in.^3
74. $189.65625\pi \text{ ft}^3 \approx 595.8 \text{ ft}^3$
75. 80 ft^3
76. $60\pi \text{ ft}^3$
77. $101,400\pi \text{ cm}^3$
78. 207.3 mm^3
79. 8 inches
80. 13 in.
81. $1197.16\pi \text{ in.}^2 \approx 3761.0 \text{ in.}^2$
82. $(20710.868\pi \div 5184) \text{ ft}^3 \approx 12.6 \text{ ft}^3$