Geometry
2nd Semester Final Review

100

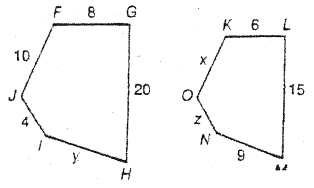
Name: Key (GeomB)

1. Pentagon *FGHIJ* ~ pentagon KLMNO.
2. Find the scale factor of *FGHIJ* to *KLMNO* 4:3.
3. Find *x*. 15/2
4. Find *y*. 12
5. Find *z*. 3

$\frac{4}{3} = \frac{10}{x}$ $4x = 30$ $x = 15/2$

$\frac{4}{3} = \frac{y}{9}$

$\frac{4}{3} = \frac{4}{z}$



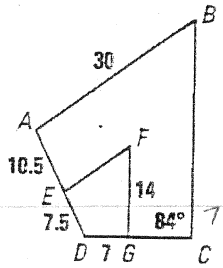

6. Find the scale factor of *ABCD* to *EFGD*. 12:5

7. Find the ratio of the perimeter of *ABCD* to the perimeter of *EFGD*. 12:5

8. a. *ED* = 7.5 b. *BC* = 168/5
c. *EF* = 25/2 d. $m\angle DGF$ = 84°

$\frac{12}{5} = \frac{30}{x}$ $12x = 150$ $x = \frac{150}{12} = \frac{50}{4}$

$\frac{12}{5} = \frac{x}{14}$ $5x = 168$



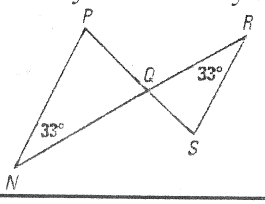



$\frac{18}{7.5} = \frac{12}{5}$

9. If a line parallel to one side of a triangle intersects the other two sides, then the triangle formed is **(always, sometimes, never)** similar to the given triangle.
10. Two obtuse triangles are ***(always, sometimes,* or *never)*** similar.
11. Two equilateral triangles are ***(always, sometimes,* or *never)*** similar.
12. Two similar triangles are ***(always, sometimes,* or *never)*** congruent.
13. Two congruent triangles are ***(always, sometimes,* or *never)*** similar.
14. Two isosceles right triangles are ***(always, sometimes,* or *never)*** similar.

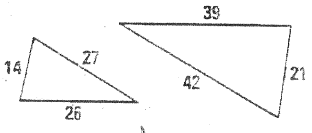
15. Determine whether the triangles can be proved similar or not. Explain why or why not. If they are similar, write a similarity statement.

Yes: AA~
$\triangle PQN \sim \triangle SQR$




16. Are the triangles similar? If so, state the postulate or theorem that can be used to prove that the triangles are similar.

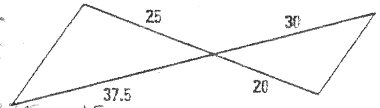
a.




$\frac{14}{21} = \frac{2}{3}$ $\frac{26}{39} = \frac{2}{3}$ $\frac{27}{42} = \frac{9}{14}$

No

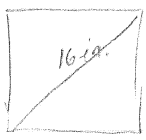
b.




$\frac{25}{20} = \frac{5}{4}$ $\frac{37.5}{30} = \frac{375}{300} = \frac{15}{12} = \frac{5}{4}$

Yes: SAS~

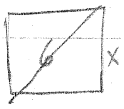
17. The length of a diagonal of a square is 16 inches. ~~What is its perimeter?~~
a. $8\sqrt{2}$ in. b. $16\sqrt{2}$ in. c. $30\sqrt{2}$ in. d. $32\sqrt{2}$ in. e. $48\sqrt{2}$ in.




$16 = x\sqrt{2}$ $x = 8\sqrt{2}$ $\cdot\sqrt{2}$ $32\sqrt{2}$

24

18. A diagonal of a square is 6 inches long. Find its perimeter and its area in simplest radical form.




$6 = x\sqrt{2}$

$x = 3\sqrt{2}$

$P = 12\sqrt{2}$ in.

$A = 18$ in$^2$

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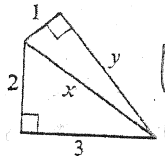
Find the value of each variable.

19.




$x^2 = 2^2 + 3^2$

$x = \sqrt{13}$

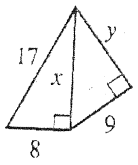
$(\sqrt{13})^2 = y^2 + 1^2$

$13 = y^2 + 1$

$12 = y^2$

$y = 2\sqrt{3}$

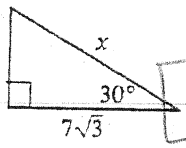
20.




$x = 15$

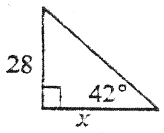
$y = 12$

21.




$X = 14$

22.



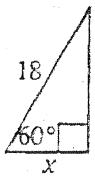

$\tan 42 = \frac{28}{x}$

$.9004 \approx \frac{28}{x}$

$.9004x \approx 28$

$x \approx 31.1$

23.

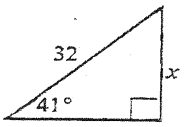



hyp = 2 · short

$18 = 2x$

$x = 9$

24.




$\sin 41 = \frac{x}{32}$

$.6561 \approx \frac{x}{32}$

$x \approx 21.0$

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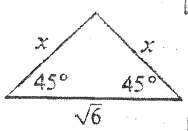
Find the value of each variable.

25.

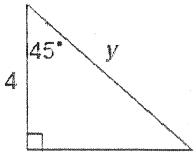



hyp = leg$\sqrt{2}$

$\sqrt{6} = x\sqrt{2}$

$x = \sqrt{3}$

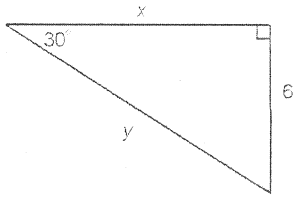
26.




$x = 4$

$y = 4\sqrt{2}$

27.




long = short$\sqrt{3}$

$x = 6\sqrt{3}$

hyp = 2 · short

$y = 2 \cdot 6$

$y = 12$

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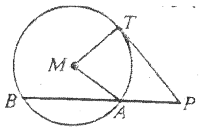
28. List a chord in the diagram: $\overline{BA}$
29. List a radius in the diagram: $\overline{MA}$ or $\overline{MT}$
30. List a tangent in the diagram: $\overleftrightarrow{TP}$
31. List a secant in the diagram: $\overleftrightarrow{BP}$ (etc.)
32. List a point of tangency in the diagram: T

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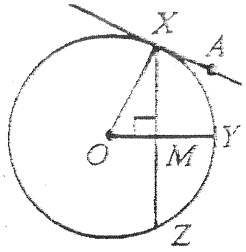
33. If the radius of $\odot O$ is 13 and $XZ = 24$, what is the distance from $O$ to chord $\overline{XZ}$?

a. 5 b. 8 c. 11 d. $\sqrt{407}$




34. If $OM = 8$ and $MY = 9$, what does $XZ$ equal?

a. $6\sqrt{2}$ b. $2\sqrt{17}$ c. $\sqrt{145}$ d. 30

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Name a point, segment, line, or circle that represents the phrase.

35. Diameter of ⊙P. $\overline{BN}$

36. Point of tangency of ⊙Q. C (or D)

37. Chord of ⊙P. $\overline{BF}$ (or $\overline{BN}$)

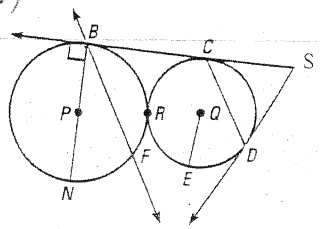
38. Center of larger circle. P

39. Radius of ⊙Q. $\overline{QE}$

40. Common tangent. $\overleftrightarrow{BS}$

41. Secant $\overleftrightarrow{BF}$

42. Point of tangency of ⊙P and ⊙Q. R

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43. If $m\overset{\frown}{AB} = 130$ and $m\overset{\frown}{CD} = 70$, then $m\angle 2 =$ 100.

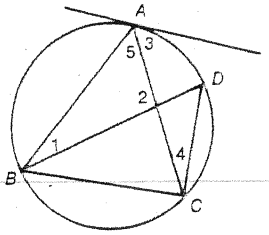
44. If $m\angle 4 = 26$, then $m\angle 1 =$ 26.

45. If $m\overset{\frown}{AB} = 100$ and $m\overset{\frown}{BC} = 120$, then $m\angle 3 =$ 70.

46. If $\overline{AB} \cong \overline{AC}$ and $m\overset{\frown}{AB} = 130$, then $m\angle 5 =$ 50.

47. If $m\angle 2 = 105$ and $m\overset{\frown}{DC} = 55$, then $m\overset{\frown}{AB} =$ 155.

48. If $\overline{DB}$ is a diameter, then $m\angle BCD =$ 90.




$105 = \frac{1}{2}(x+55)$

$210 = x + 55$

$-55 \quad -55$

$155 = x$

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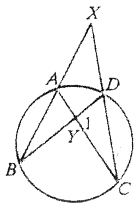
49. If $m\overset{\frown}{BC} = 120$ and $m\overset{\frown}{AD} = 50$, what is the measure of $\angle X$?

a. 25 (b. 35) c. 60 d. 70

50. If $m\overset{\frown}{BC} = 120$ and $m\overset{\frown}{AD} = 50$, what is the measure of $\angle 1$?

a. 60 b. 85 c. 90 (d. 95)

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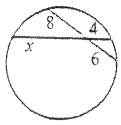
Find the value of $x$.

51.

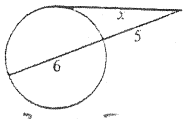



$4x = 8 \cdot 6$

$4x = 48$

$x = 12$

52.

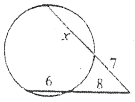



$x^2 = 11 \cdot 5$

$x^2 = 55$

$x = \sqrt{55}$

53.




$(x+7)7 = (6+8)8$

$7x + 49 = 112$

$-49 \quad -49$

$7x = 63$

$x = 9$

14
8
112

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In the diagram shown, $\overline{CA}$ is tangent to the circle at $A$.

54. If $AG = 2$, $GD = 9$ and $BG = 3$, find $GF$.

$3x = 2 \cdot 9$

$3x = 18$

6

55. If $CF = 12$, $CB = 3$, and $CD = 9$, find $CE$.

$12 \cdot 3 = 9 \cdot x$

$36 = 9x$

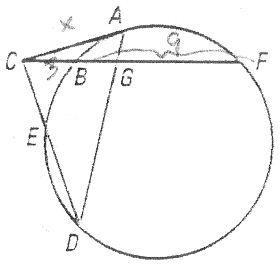
4

56. If $BF = 9$ and $CB = 3$, find $CA$.

$12 \cdot 3 = x^2$

$36 = x^2$

6

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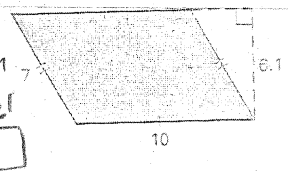
57. A regular polygon is (always, sometimes, never) equilateral.

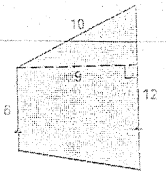
23

Find the area of each polygon.

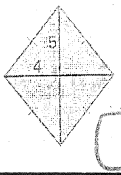
58. $A = b \cdot h$ $A = 10 \cdot 6.1$ $A = 61$




59. $A = \frac{1}{2}h(b_1 + b_2)$ $A = \frac{1}{2} \cdot 9(12+6)$ $A = \frac{1}{2} \cdot 9 \cdot 18$ $A = 81$

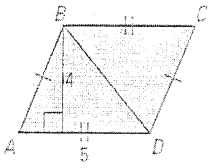



60.




$A = \frac{1}{2} \cdot d_1 \cdot d_2$ $A = \frac{1}{2} \cdot 8 \cdot 10$ $A = 40$

61.

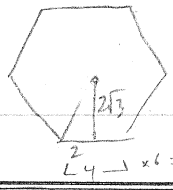



$A = b \cdot h$ $A = 5 \cdot 4$ $A = 20$

Find the area of each figure described.

62. A rhombus with diagonals 5 and 4 $A = 10$

63. A regular hexagon with apothem $2\sqrt{3}$ cm $A = 24\sqrt{3}\ cm^2$




$A = \frac{1}{2} \cdot a \cdot P$ $A = \frac{1}{2} \cdot 2\sqrt{3} \cdot 24$ $A = 24\sqrt{3}$

$4 \times 6 = P = 24$

64. Find the measure of the central angles of a regular 15-gon. 24°

360 / 15 = 24

65. Find the area of an equilateral triangle with sides length 14 inches. $49\sqrt{3}\ in^2$

$\frac{1}{2} \cdot b \cdot h$ $\frac{1}{2} \cdot 14 \cdot 7\sqrt{3}$

7√3, 7, 14

66. A regular octagon has sides of length 12 cm. Another regular octagon has sides of length 18 cm. Find the ratio of the area of the smaller octagon to the area of the larger octagon. 12:18 = 2:3

a. 4:9 b. 2:3 c. 12:18 d. 18:12 e. 9:4

67. If the ratio of the perimeters of two similar rectangles is 3:5, then the ratio of their areas is (*always, sometimes, never*) 9:25.

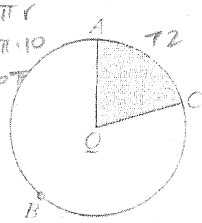
68. In the diagram of circle $Q$, arc $ABC$ is 288° and $QA = 10$.

a. Find the length of $\overset{\frown}{AC}$ in terms of $\pi$. $4\pi$

b. Find the area of sector $AQC$ in terms of $\pi$. $20\pi$

a) $\frac{l}{C} = \frac{72}{360}$ $C = 2\pi r$ $C = 2\pi \cdot 10$ $C = 20\pi$

$\frac{l}{20\pi} = \frac{1}{5}$ $5l = 20\pi$




b) $\frac{A_{sect}}{A_\odot} = \frac{m\overset{\frown}{AC}}{360}$ $\frac{A}{100\pi} = \frac{1}{5}$

360 − 288 = 72

## FORMULAS FOR SOLIDS

| Prism | Pyramid | Cylinder | Cone | Sphere |
|---|---|---|---|---|
| $LA = Ph$ | $LA = \frac{1}{2}Pl$ | $LA = C \cdot h$ *or* $LA = 2\pi rh$ | $LA = \pi rl$ | $A = 4\pi r^2$ |
| $TA = LA + 2B$ | $TA = LA + B$ | $TA = LA + 2B$ | $TA = LA + B$ | $V = \frac{4}{3}\pi r^3$ |
| $V = Bh$ | $V = \frac{1}{3}Bh$ | $V = Bh$ | $V = \frac{1}{3}Bh$ | |

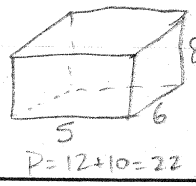
17

3 69. Find the lateral area, total area, and volume of a rectangular prism with length 5, width 6, and height 8.

$TA = LA + 2 \cdot B$ $V = B \cdot h$

$TA = 176 + 2 \cdot 30$ $V = 30 \cdot 8$

$TA = 176 + 60$




$P = 12 + 10 = 22$

$LA = P \cdot h$

$LA = 22 \cdot 8$

$LA = 176$

22 × 8 = 176

$A = b \cdot h$

$A = 5 \cdot 6$

$A = 30$

L.A. = 176 T.A. = 236 V = 240

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70. Find the lateral area of a regular pentagonal prism with base edges 6 and height 8.

$LA = P \cdot h$

$LA = 30 \cdot 8$

$LA = 240$

× 5

$P = 30$

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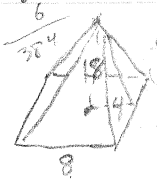
4 71. Find the slant height, lateral area, total area, and volume of a square pyramid with base edge 8 and height 18.

$LA = \frac{1}{2} \cdot P \cdot l$ $P = 8 \cdot 4$ $TA = LA + B$ $A = 8^2$ $V = \frac{1}{3} B \cdot h$

$LA = \frac{1}{2} \cdot 32 \cdot 2\sqrt{85}$ $P = 32$ $A = 64$ $V = \frac{1}{3} 64 \cdot 18$




$l^2 = 18^2 + 4^2$

$l^2 = 324 + 16$

$l^2 = 340$

$l = 2\sqrt{85}$

$l = 2\sqrt{85}$ L.A. = $32\sqrt{85}$ T.A. = $64 + 32\sqrt{85}$ V = 384

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3 72. Find the lateral area, total area, and volume of a cylinder with $r = 8$ and $h = 12$.

$LA = C \cdot h$ $C = 2\pi r$ $TA = LA + 2 \cdot B$ $A = \pi r^2$ $V = B \cdot h$

$LA = 16\pi \cdot 12$ $C = 2\pi \cdot 8$ $TA = 192\pi + 2 \cdot 64\pi$ $A = \pi \cdot 8^2$ $V = 64\pi \cdot 12$

$C = 16\pi$ $TA = 192\pi + 128\pi$ $A = 64\pi$

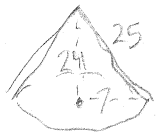

L.A. = $192\pi$ T.A. = $320\pi$ V = $768\pi$

3 73. Find the lateral area, total area, and volume of a cone with $r = 7$, $h = 24$, and $l = 25$.

$LA = \pi r l$ $TA = LA + B$ $A = \pi r^2$ $V = \frac{1}{3} B \cdot h$

$LA = \pi \cdot 7 \cdot 25$ $TA = 175\pi + 49\pi$ $A = \pi \cdot 7^2$ $V = \frac{1}{3} \cdot 49\pi \cdot 24$

$A = 49\pi$




L.A. = $175\pi$ T.A. = $224\pi$ V = $392\pi$

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2 74. Find the area and volume of a sphere with radius 3 cm.

$A = 4\pi r^2$ $V = \frac{4}{3} \pi r^3$

$A = 4\pi \cdot 3^2$ $V = \frac{4}{3} \pi \cdot 3^3$

$A = 4\pi \cdot 9$ $V = \frac{4}{3} \pi \cdot 27$

A = $36\pi$ V = $36\pi$

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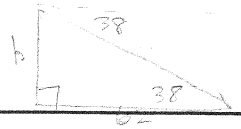
75. A man is standing on top of a building. He looks down at a car on the street with an angle of depression of 38 degrees. If the car is 62 feet from the base of the building, how tall is the building?




$\tan 38 = \frac{b}{62}$

$b \approx 48.4$ ft.

76. An observer located 2 km from a helicopter launching pad sees a helicopter at an angle of elevation of 48°. How high is the helicopter at that moment?


$\tan 48 = \frac{h}{2}$

$h \approx 2.2\text{km}$

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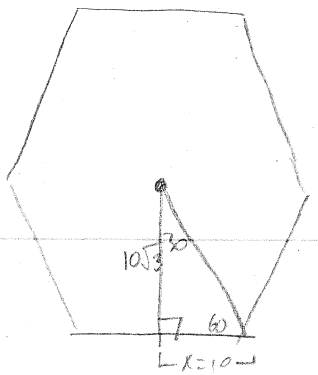
77. Find the area of a regular hexagon that has a perimeter of 120. Give your answer in simplest radical form.




$s = 20$

$P = 120$

$A = \frac{1}{2} \cdot a \cdot P$

$A = \frac{1}{2} \cdot 10\sqrt{3} \cdot 120$

$A = 600\sqrt{3}$