Key _____ Date _____ Block _____

Pre-AP Geometry: Spring Semester Final Exam Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

-1/20 1. Given that two points on line m are $P(9, 2)$ and $Q(-11, 3)$, write a ratio expressing the slope of m.

$\frac{3-2}{-11-9} = \frac{1}{-20}$

19.5 2. The ratio of the side lengths of a quadrilateral is 4:3:4:7, and its perimeter is 117 meters. What is the length of the shortest side?

$4x+3x+4x+7x=117$

$18x=117$

$x=6.5$

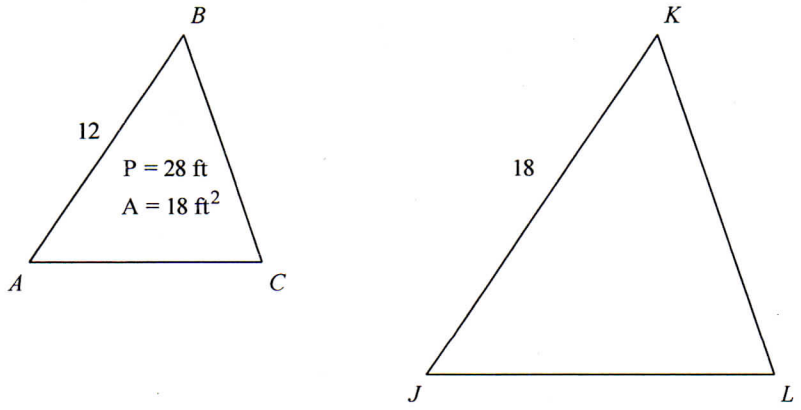
$3(6.5)$

45 3. A tree is standing next to a 40-foot high building. The tree has an 18-foot shadow, while the building has a 16-foot shadow. How tall is the tree, rounded to the nearest foot?

$\frac{40}{x} = \frac{16}{18} \Rightarrow x=45$

$\frac{x}{18} \quad \frac{40}{16}$

A 4. Given $\triangle ABC \sim \triangle JKL$, find the perimeter and area of $\triangle JKL$.



$\frac{12}{18} = \frac{28}{x}$

$12x=504$ $x=42$

$P=42$

$\left(\frac{12}{18}\right)^2 = \frac{18}{x}$

$\frac{144}{324} = \frac{18}{x}$ $144x=5832$

$x=40.5$

$A=40.5$

a. $P = 42$ ft, $A = 40.5$ ft^2

b. $P = 40.5$ ft, $A = 42$ ft^2

c. $P = 18.7$ ft, $A = 9$ ft^2

d. $P = 9$ ft, $A = 18.7$ ft^2

Solve each proportion.

$-5\frac{2}{3}$ 5. $\frac{x+1}{x-1} = \frac{14}{20}$

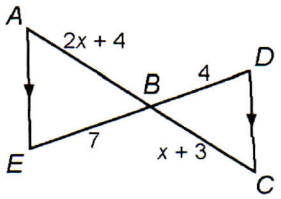
$20x+20=14x-14$

$6x=-34$

$x=-5\frac{2}{3}$

Find x and the measures of the indicated parts.

A 6.



$\frac{2x+4}{x+3} = \frac{7}{4}$

$8x+16=7x+21$

$x=5$

$AB=2(5)+4=14$

$BC=5+3=8$

AB and *BC*

a. $x = 5$, $AB = 14$, $BC = 8$

b. $x = -1.6$, $AB = 0.8$, $BC = 1.4$

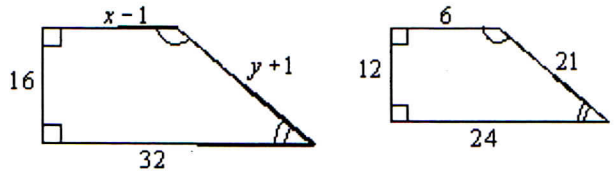
c. $x = 5$, $AB = 6$, $BC = 2$

d. $x = -1.6$, $AB = 7.2$, $BC = 4.6$

The polygons are similar, but not necessarily drawn to scale. Find the values of x and y.

7.

x=9
y=27



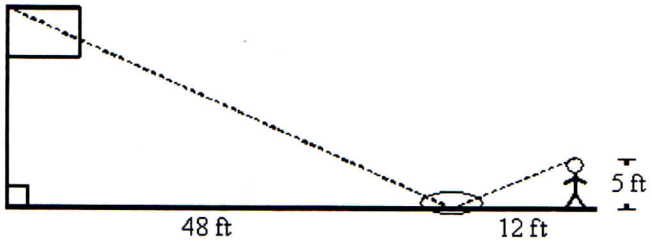
$\frac{x-1}{6} = \frac{16}{12}$ $\quad \frac{16}{12} = \frac{y+1}{21}$

$12x - 12 = 96$ $\quad 12y + 12 = 336$

$12x = 108$ $\quad x = 9$ $\quad 12y = 324$

$y = 27$

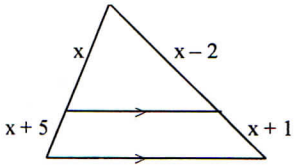
x=20 8. Michele wanted to measure the height of her school's flagpole. She placed a mirror on the ground 48 feet from the flagpole, then walked backwards until she was able to see the top of the pole in the mirror. Her eyes were 5 feet above the ground and she was 12 feet from the mirror. Using similar triangles, find the height of the flagpole to the nearest tenth of a foot.



$\frac{5}{x} = \frac{12}{48}$ $\quad x = 20$

Solve for x.

x=5 9.



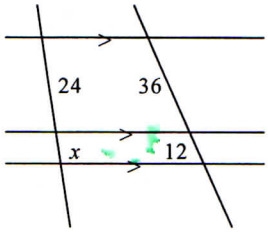
$\frac{x}{x+5} = \frac{x-2}{x+1}$

$x^2 + x = x^2 + 3x - 10$

$10 = 2x$

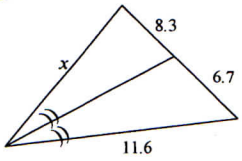
$5 = x$

x=8 10.



$\frac{24}{x} = \frac{36}{12}$ $\quad x = 8$

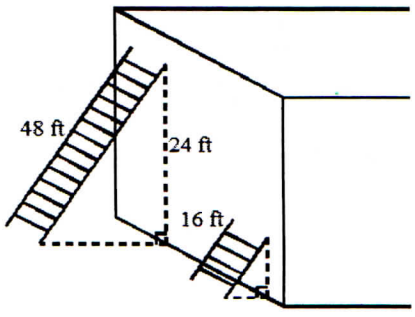
x=14.4 11. Find x to the nearest tenth.



Not drawn to scale

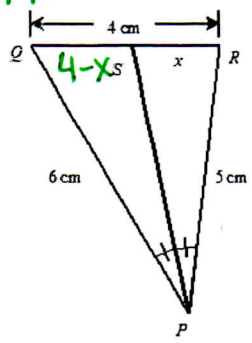
$\frac{8.3}{6.7} = \frac{x}{11.6}$

x=8 12. Two ladders are leaning against a wall at the same angle as shown. How far up the wall does the shorter ladder reach?



$\frac{24}{x} = \frac{48}{16}$

A 13. Find x.



$\frac{4-x}{x} = \frac{6}{5}$

$6x = 20 - 5x$

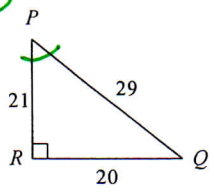
$11x = 20$

$x = 1.8$

a. $1\frac{9}{11}$ c. $2\frac{1}{3}$

b. 2 d. 3

B 14. Write the tangent ratios for $\angle P$ and $\angle Q$.



Not drawn to scale

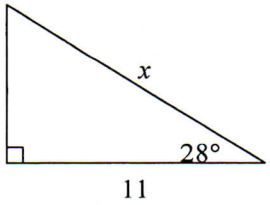
$\tan P \frac{20}{21}$

a. $\tan P = \frac{29}{21}$; $\tan Q = \frac{21}{29}$ c. $\tan P = \frac{21}{20}$; $\tan Q = \frac{20}{21}$

b. $\tan P = \frac{20}{21}$; $\tan Q = \frac{21}{20}$ d. $\tan P = \frac{29}{20}$; $\tan Q = \frac{20}{29}$

Find the value of *x*. Round to the nearest tenth.

12.5 15.

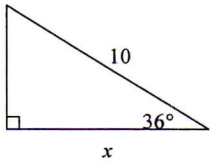


Not drawn to scale

$\cos 28 = \frac{11}{x}$

$x = \frac{11}{\cos 28}$

8.1 16.

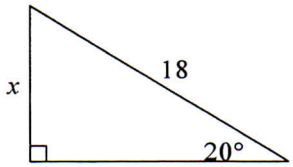


Not drawn to scale

$\cos 36 = \frac{x}{10}$

$10\cos 36 = x$

6.2 17.

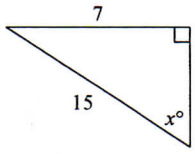


Not drawn to scale

$\sin 20 = \frac{x}{18}$

$18\sin 20 = x$

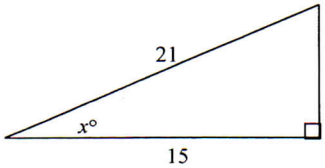
28° 18.



Not drawn to scale

$\sin^{-1}\frac{7}{15}$

44° 19.

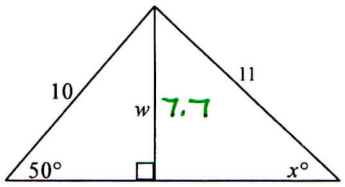


Not drawn to scale

$\cos^{-1}\frac{15}{21}$

44

A 20. Find the value of w and then x. Round lengths to the nearest tenth and angle measures to the nearest degree.



$\sin 50 = \frac{w}{10}$

$10 \sin 50 = w$

$w = 7.7$

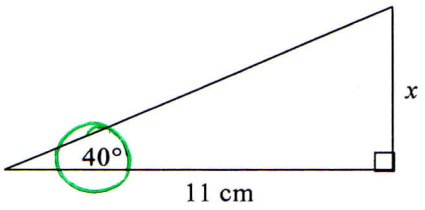
$\sin^{-1}\frac{7.7}{11}$

44

a. $w = 7.7, x = 44$
b. $w = 6.4, x = 54$
c. $w = 7.7, x = 54$
d. $w = 6.4, x = 44$

Find the value of x. Round the length to the nearest tenth.

9.2 21.



Not drawn to scale

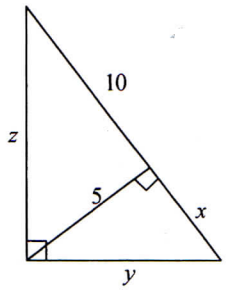
$11 \tan 40 = \frac{x}{11} \cdot 11$

$11 \tan 40 = 9.2$

4 22. Find the geometric mean of the pair of numbers 2 and 8.

$\sqrt{2 \cdot 8}$

B 23. Find x, y, and z.



$\frac{x}{5} = \frac{5}{10}$

$10x = 25$

$x = 2.5$

$12.5 \rightarrow \frac{25}{2}$

$\frac{\frac{25}{2}}{y} = \frac{y}{\frac{5}{2}}$

$\sqrt{y^2} = \sqrt{\frac{125}{4}}$

$y = \frac{5\sqrt{5}}{2}$

$\frac{\frac{25}{2}}{z} = \frac{z}{10}$

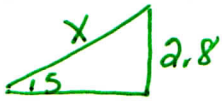
$\sqrt{z^2} = \sqrt{125}$

$z = 5\sqrt{5}$

a. $x = 5, y = 5\sqrt{2}, z = 5\sqrt{7}$
b. $x = 2.5, y = \frac{5\sqrt{5}}{2}, z = 5\sqrt{5}$
c. $x = 3, y = 4, z = \sqrt{153}$
d. $x = 5\sqrt{2}, y = 5\sqrt{3}, z = 5\sqrt{5}$

____ 24. Jessie is building a ramp for loading motorcycles onto a trailer. The trailer is 2.8 feet off of the ground. To avoid making it too difficult to push a motorcycle up the ramp, Jessie decides to make the angle between the ramp and the ground 15°. To the nearest hundredth of a foot, find the length of the ramp.

10.82



$\sin 15 = \frac{2.8}{x}$

$x = \frac{2.8}{\sin 15}$

A 25. Use your calculator to find the angle measures $\sin^{-1}(0.7)$, $\cos^{-1}(0.3)$, and $\tan^{-1}(38.4)$ to the nearest tenth of a degree.

a. $\sin^{-1}(0.7) = 44.4°$, $\cos^{-1}(0.3) = 72.5°$, $\tan^{-1}(38.4) = 88.5°$
b. $\sin^{-1}(0.7) = 0.8°$, $\cos^{-1}(0.3) = 1.3°$, $\tan^{-1}(38.4) = 1.5°$
c. $\sin^{-1}(0.7) = 1.3°$, $\cos^{-1}(0.3) = 0.8°$, $\tan^{-1}(38.4) = 1.5°$
d. $\sin^{-1}(0.7) = 72.5°$, $\cos^{-1}(0.3) = 44.4°$, $\tan^{-1}(38.4) = 88.5°$

403 26. The largest Egyptian pyramid is 146.5 m high. When Rowena stands far away from the pyramid, her line of sight to the top of the pyramid forms an angle of elevation of 20° with the ground. What is the horizontal distance between the center of the pyramid and Rowena? Round to the nearest meter.

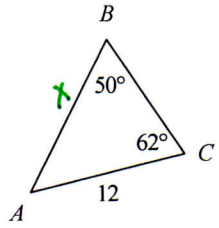
403

$\tan 20 = \frac{146.5}{x}$ $x = \frac{146.5}{\tan 20}$

C 27. Use a calculator to find the trigonometric ratios **sin123°, cos95°, and tan125°**. Round to the nearest hundredth.

a. **sin123°** = –0.09, **cos95°** = 0.84, **tan125°** = –1.43
b. **sin123°** = –0.46, **cos95°** = 0.73, **tan125°** = –0.78
c. **sin123°** = 0.84, **cos95°** = –0.09, **tan125°** = –1.43
d. **sin123°** = 0.84, **cos95°** = 0.996194698092, **tan125°** = –1.43

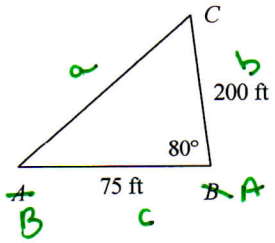
13.8 28. Find *AB*. Round to the nearest tenth.



AAS → Law of Sines

$\frac{\sin 50}{12} = \frac{\sin 62}{x}$ $x \sin 50 = 12 \sin 62$ $\frac{x \sin 50}{\sin 50} = \frac{12 \sin 62}{\sin 50}$

201 29. A dam needs a supporting beam. The dam leans at an 80° angle and is 200 ft tall. If the base of the supporting beam is placed 75 feet from the base of the dam and the beam extends to the top of the dam, how long must the beam be?

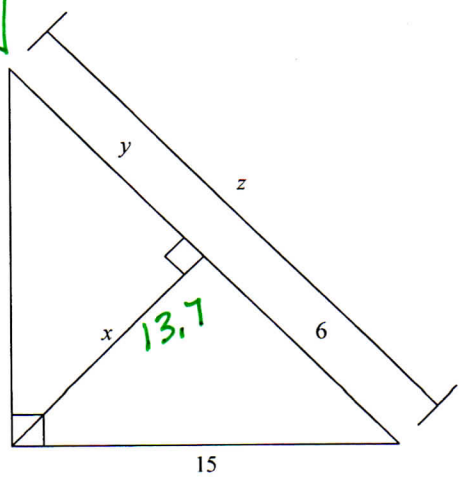


SAS → Law of Cosines

$a^2 = b^2 + c^2 - 2bc\cos A$
$a^2 = 200^2 + 75^2 - 2(200)(75)\cos 80$
$a^2 = 40415.6$
$\sqrt{a^2} = \sqrt{40415.6}$ $a = 201$

30. Find *x*, *y*, and *z*.

a or d



$6^2 + x^2 = 15^2$
$36 + x^2 = 225$
$x^2 = 189$
$x = 13.7$

$\frac{6}{13.7} = \frac{13.7}{y}$
$6y = 187.69$
$y = 31.5$

$z = 6 + 31.5 = 37.5$

a. $x \approx 13.7, y \approx 31.5, z \approx 37.5$
b. $x \approx 37.5, y \approx 13.7, z \approx 31.5$
c. $x \approx 31.5, y \approx 37.5, z \approx 13.7$
d. $x \approx 13.7, y \approx 31.5, z \approx 37.5$

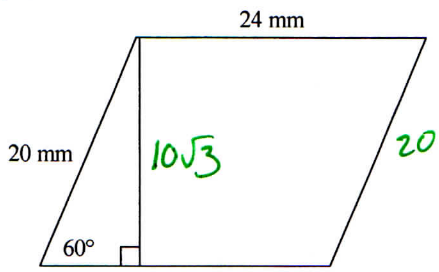
Same

____ 31. A water slide is 400 yards long with a vertical drop of 36.3 yards. Find the angle of depression of the side.

____ 32. A playground is situated on a triangular plot of land. Two sides of the plot are 175 feet long and they meet at an angle of 70°. For safety reasons, a fence is to be placed along the perimeter of the property. How much fencing material is needed?

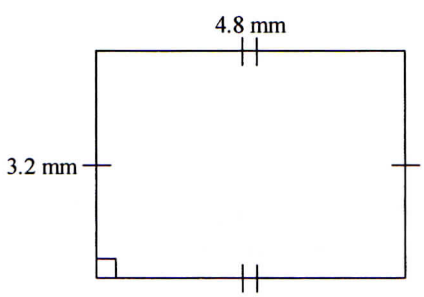
____ 33. Zack, Rachel, and Maddie are unraveling a huge ball of yarn to see how long it is. As they move away from each other, they form a triangle. The distance from Zack to Rachel is 3 meters. The distance from Rachel to Maddie is 2.5 meters. The distance from Maddie to Zack is 4 meters. Find the measures of the three angles in the triangle.

____ 34. Find the perimeter and area of the parallelogram. Round to the nearest tenth if necessary.

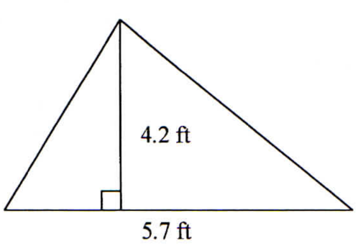


a. 88 mm; 415.7 mm^2
b. 44 mm; 346.4 mm^2
c. 44 mm; 415.7 mm^2
d. 88 mm; 346.4 mm^2

____ 35. Find the perimeter and area of the parallelogram. Round to the nearest tenth if necessary.



____ 36. Find the area of the figure. Round to the nearest tenth if necessary.

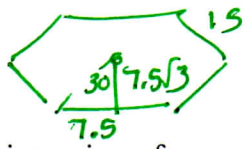


a. 13.1 ft^2
b. 12 ft^2
c. 23.9 ft^2
d. 12.8 ft^2

___ 37. Find the area of a regular hexagon with a perimeter of 90 centimeters. Exact value.

$\frac{1}{2} \cdot 90 \cdot 7.5\sqrt{3}$

$337.5\sqrt{3}$



$P = 90 \quad s = 90/6 = 15$

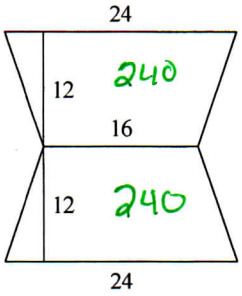
___ 38. Find the area of a circle having a circumference of 34π. Round to the nearest tenth. Use 3.14 for pi.

$C = 2\pi r \quad r = 17 \quad A = \pi \cdot 17^2$

289π

Find the area of the figure. Round to the nearest tenth if necessary.

___ 39.



480

(Trap)

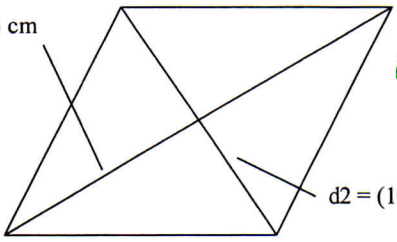
$\frac{1}{2} h(b_1 + b_2)$

$\frac{1}{2} \cdot 12(24 + 16)$

240

240

___ 40. Find the area of the rhombus.



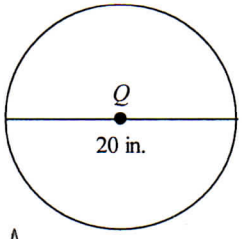
$A = \frac{1}{2}(6x+4)(10x+10)$

$A = \frac{1}{2}[60x^2 + 60x + 40x + 40]$

$A = \frac{1}{2}[60x^2 + 100x + 40]$

$A = 30x^2 + 50x + 20$

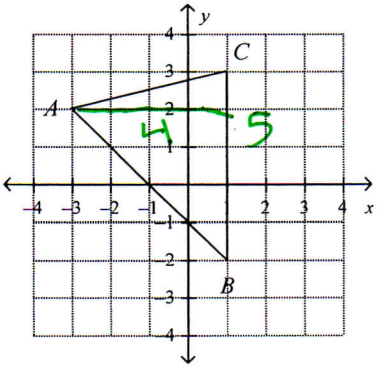
___ 41. Find the area of $\odot Q$ in terms of π.



$r = 10$

$A = 100\pi$

___ 42. Find the area of the triangle with vertices $A(-3, 2)$, $B(1, -2)$, and $C(1, 3)$.



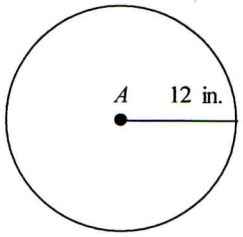
$\frac{5 \cdot 4}{2} = 10$

a. 10 units^2
b. 20 units^2
c. 8 units^2
d. 12 units^2

C 43. The base length of the triangle with vertices $A(1, 1)$, $B(9, 1)$, and $C(5, 5)$ is multiplied by 2. Describe the effect of the change on the area.

a. The area is multiplied by 4.
c. The area is multiplied by 2.
b. There is no effect on the area.
d. The area is multiplied by 8.

B 44. The radius of $\odot A$ is multiplied by $\frac{1}{3}$. Describe the effect of the change on the area.



$(\frac{1}{3})^2$

All Dim	P	A	V
x	x	x^2	x^3

a. The area is multiplied by 3.
c. There is no effect on the area.
b. The area is multiplied by $(\frac{1}{3})^2$.
d. The area is multiplied by $\frac{1}{3}$.

45. The area of a parallelogram is 420 cm^2 and the height is 35 cm. Find the corresponding base.

b=12

$A_\square = bh$

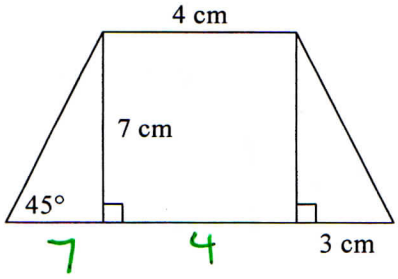
$420 = b \cdot 35$

$12 = b$

Find the area of the trapezoid. Leave your answer in simplest radical form.

46.

$63\ cm^2$



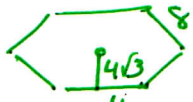
Not drawn to scale

$\frac{1}{2} \cdot 7(14+4)$

$\frac{1}{2} 7 \cdot 18$

$= 63\ cm^2$

$96\sqrt{3}\ m^2$ 47. Find the area of a regular hexagon with side length of 8 m. Answers in exact value.



$P = 4 \cdot 8$

$a = 4\sqrt{3}$

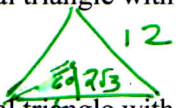
$\frac{1}{2} \cdot 48 \cdot 4\sqrt{3}$

$96\sqrt{3}$

$36\sqrt{3}$ 48. Find the area of an equilateral triangle with side 12.

$P = 36$

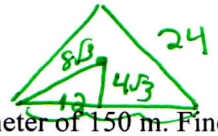
$A = \frac{1}{2} 2\sqrt{3} \cdot 36$



30	60	90
$2\sqrt{3}$	6	

B 49. Find the area of an equilateral triangle with radius $8\sqrt{3}$ m. Leave your answer in simplest radical form.

a. $96\sqrt{3}\ m^2$
b. $144\sqrt{3}\ m^2$
c. $18\sqrt{3}\ m^2$
d. $12\sqrt{3}\ m^2$



$4\sqrt{3} \cdot \sqrt{3} = 12$

$P = 72$

$A = \frac{1}{2} \cdot 72 \cdot 4\sqrt{3}$

$144\sqrt{3}$

$900\sqrt{3}$ 50. A regular hexagon has a perimeter of 150 m. Find its area. Leave your answer in simplest radical form.

$\frac{1}{2} \cdot 12\sqrt{3} \cdot 150$

$P = 150$

$a = 12\sqrt{3}$

A 51. The widths of two similar rectangles are 16 cm and 14 cm. What is the ratio of the perimeters? Of the areas?

a. 8 : 7 and 64 : 49
c. 9 : 8 and 81 : 64
b. 9 : 8 and 64 : 49
d. 8 : 7 and 81 : 64

$P = \frac{16}{14} = \frac{8}{7}$

$A = (\frac{8}{7})^2 = \frac{64}{49}$

The figures are similar. The area of one figure is given. Find the area of the other figure to the nearest whole number.

____ 52. A rectangular napkin costs $3.25. A similar tablecloth is five times longer and five times wider. How much would you expect to pay for the tablecloth?

3.25 · 25

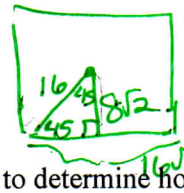
$81.25

Find the area of the regular polygon. Give the answer to the nearest tenth.

512

____ 53. square with radius 16 ft

$\frac{16}{\sqrt{2}} \Rightarrow 8\sqrt{2}$



$\frac{1}{2} \cdot 8\sqrt{2} \cdot 64\sqrt{2}$

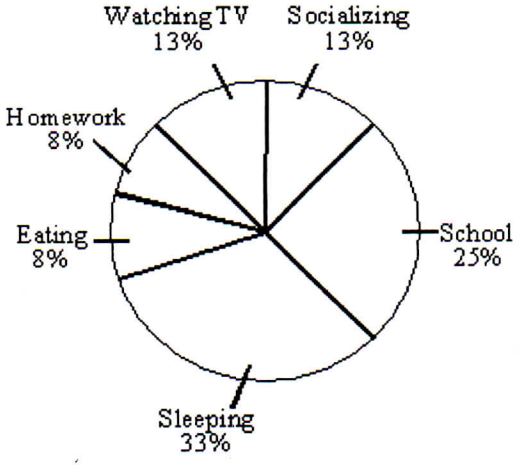
$= 512$

____ 54. Grade 7 students were surveyed to determine how many hours a day they spent on various activities. The results are shown in the circle graph below. Find the measure of each central angle in the circle graph.

a. Sleeping

b. Eating

How Students Spend Their Time



a) $\frac{33}{100} = \frac{x}{360}$

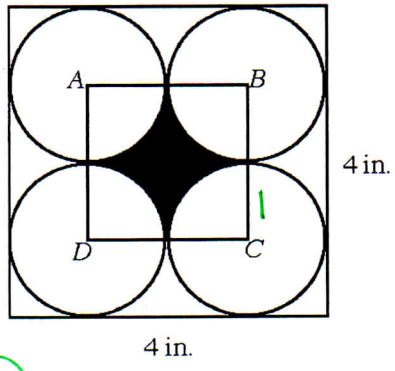
a) $x = 118.8$

b) $\frac{8}{100} = \frac{x}{360}$

$100x = 2880$

$x = 28.8$

____ 55. Find the area of the shaded portion of the figure. Each vertex of square *ABCD* is at the center of a circle. Leave your answer in terms of π.



$2 \cdot 2 - \pi r^2$

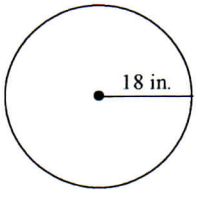
$4 - 3.14 = .86$

a. $4 - \pi$ b. $4 - \frac{1}{2}\pi$ c. $4 - \frac{\pi}{4}$ d. π

Find the circumference. Leave your answer in terms of π.

____ 56.

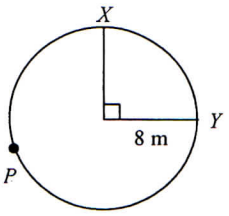
36π



$2(18)\pi$

36π

____ 57. Find the length of arc XPY. Leave your answer in terms of π.

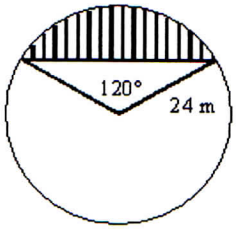


$\frac{90}{360} \cdot 2\pi \cdot 8$

$\frac{1}{4}\ 16\pi = \boxed{4\pi}$

a. 24π m b. 12π m c. 4π m d. 720π m

____ 58. Find the exact area of the shaded region.



$\frac{120}{360} \cdot \pi 24^2$

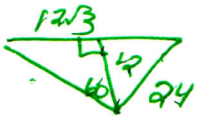
$\frac{1}{3}\ 576\pi$

$\boxed{192\pi - 144\sqrt{3}}$

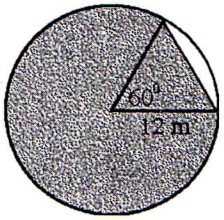
$A_{sector} - A_{\triangle}$

$\frac{1}{2} \cdot 24\sqrt{3} \cdot 12$

$144\sqrt{3}$



____ 59. Find the area of the shaded region. Leave your answer in terms of π and in simplest radical form.



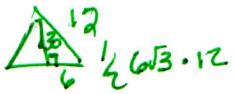
$A_{\odot} - A_{seg.}$

$A_{\odot} - [A_{sector} - A_{\triangle}]$

$A_{\odot} - A_{sector} + A_{\triangle}$

or $A_{\frac{300}{360}\text{ of }\odot} + A_{\triangle}$

$A_{sector} = \frac{5}{6} \cdot \pi 12^2$

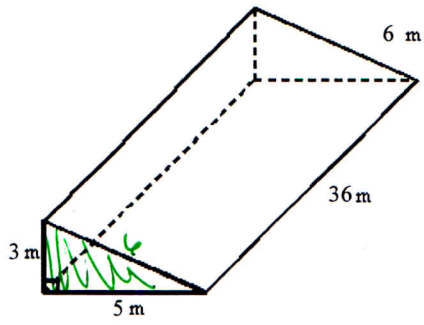


$\frac{1}{2} 6\sqrt{3} \cdot 12$

$\boxed{120\pi + 36\sqrt{3}}$

Use formulas to find the lateral area and surface area of the given prism. Show your answer to the nearest whole number.

____ 60.



Not drawn to scale

$P = 14$

$B = 7.5$

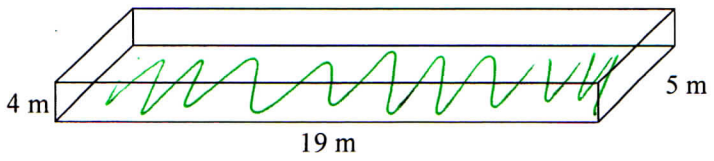
$LA = Ph$

$14 \cdot 36 = \boxed{504}$

$SA = 504 + 2(7.5)$

$= \boxed{519}$

C 61.



Not drawn to scale

$P = 48$

$B = 95$

$LA = 48 \cdot 4 = \boxed{192}$

$SA = 192 + 2(95)$

382

a. 192 m^2; 287 m^2

b. 342 m^2; 287 m^2

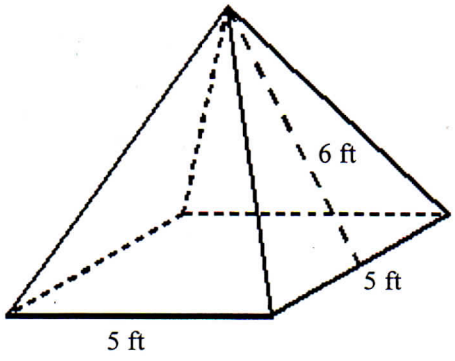
c. 192 m^2; 382 m^2

d. 342 m^2; 382 m^2

Find the surface area of the pyramid shown to the nearest whole number.

A

62.



Not drawn to scale

B = 25
P = 20
l = 6

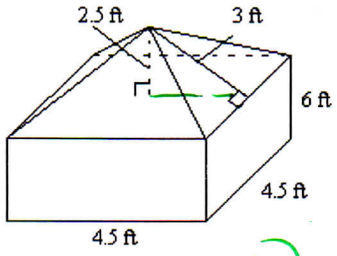
SA = ½Pl + B
½ · 20 · 6 + 25

a. 85 ft² b. 145 ft² c. 60 ft² d. 25 ft²

C

B

63. Find the surface area of the figure to the nearest whole number.



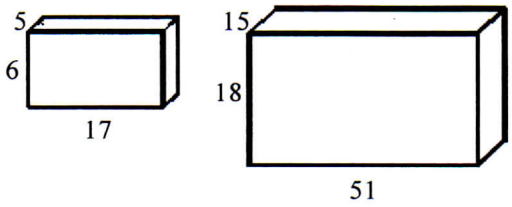
½pl → ½ · 18 · 3 = 27
+ Ph + B
18 · 6 + 20.25
+ 128.25
155.25
≈155

a. 310 ft² b. 155 ft² c. 135 ft² d. 74 ft²

Are the two figures similar? If so, give the similarity ratio of the smaller figure to the larger figure.

A

64.



Not drawn to scale

$\frac{6}{18} = \frac{5}{15} = \frac{17}{51}$

a. yes; 1: 3 b. yes; 1: 2 c. yes; 1: 5 d. no

C

B

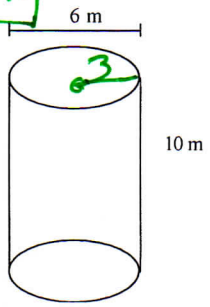
65. Find the similarity ratio of a cube with volume 729 m^3 to a cube with volume 3375 m^3.

a. 81 : 225 b. 3 : 5 c. 5 : 3 d. 225 : 81

$\frac{\sqrt[3]{729}}{\sqrt[3]{3375}} = \frac{9}{15} = \frac{3}{5}$

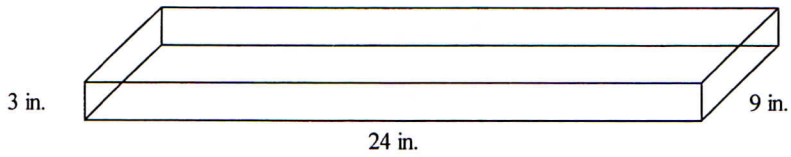
LA, 60π
SA = 78π

66. Find the lateral area and surface area of the right cylinder. Give your answer in terms of π.



2πrh + 2πr²
2 · 3 · 10
LA 60π
SA = 60π + 2 · 3² π
18π

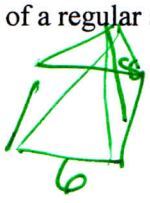
____ 67. The length, width, and height of the right rectangular prism are tripled. Describe the effect on the surface area.



All Dim	P	A	V
x	x	x^2	x^3
3		3^2	

a. The surface area is multiplied by 3.
b. The surface area is multiplied by 9.
c. The surface area is multiplied by 27.
d. The surface area is multiplied by 81.

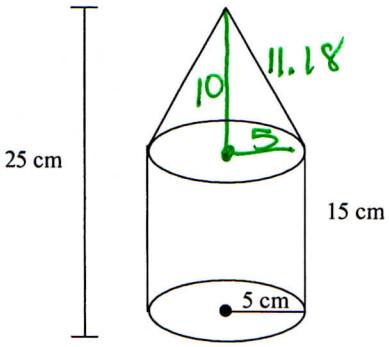
____ 68. Find the lateral area and surface area of a regular square pyramid with base edge length 6 m and slant height 8 m.



$LA = \frac{1}{2}Pl$ $\frac{1}{2} \cdot 24 \cdot 8 = 96$ $SA = 96 + 36 = 132$

$P = 24$ $B = 36$ $l = 8$

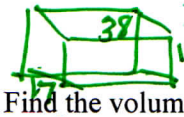
C ____ 69. Find the surface area of the composite figure. Round to the nearest square centimeter.



$LA_{cone} + LA_{cyl} + B_{cyl}$
$\pi rl + 2\pi rh + \pi r^2$
$\pi \cdot 5 \cdot 11.2 + 2\pi \cdot 5 \cdot 15 + \pi \cdot 5^2$
$56\pi + 150\pi + 25\pi$
$231\pi \approx 725.34$

a. 550 cm^2
b. 656 cm^2
c. 725 cm^2
d. 814 cm^2

____ 70. A fish tank is in the shape of a rectangular prism. The height of the tank is ~~18~~ 1.5 in. The width of the tank is ~~17~~ 1.42 in. The length of the tank is ~~38~~ 3.17 in. Find the amount of water the tank can hold to the nearest gallon. (*Hint*: 1 gallon ≈ 0.134 ft^3.)



$V = lwh$: $6.75 \approx 50.4$ 50 gal

____ 71. Find the volume of a cylinder with a base area of 25π in^2 and height equal to the radius. Give your answer both in terms of π and rounded to the nearest tenth.

$\pi r^2 = B$ $\pi r^2 = 25\pi$ $r = 5$

$V = Bh$ $25\pi \cdot 5 = 125\pi$

____ 72. Find the volume of a rectangular pyramid with length 11 m, width 7 m, and height 8 m. Round to the nearest tenth, if necessary.

V = 205.3

$V = \frac{1}{3}Bh$ $\frac{1}{3} \cdot 77 \cdot 8$

391.1π ____ 73. Find the volume of a cone with a base circumference of 19π cm and a height 6 cm less than twice the radius. Give your answer both in terms of π and rounded to the nearest tenth.

$C = 2\pi r$ $19\pi = 2\pi r$ $9.5 = r$

$V = \frac{1}{3}\pi r^2 h$ $\frac{1}{3}\pi \cdot 9.5^2 \cdot 13$

6 less than 19 = 13

391.1π

____ 74. Find the diameter of a sphere with volume 972π in^3.

a. 28.6 in.
b. 18 in.
c. 12.5 in.
d. 9 in.

$\left(\frac{4}{3}\right)\pi r^3 = 972\pi$

$r^3 = 972\left(\frac{3}{4}\right)$

$r^3 = 729$

$r = 9$

$d = 18$

____ 75. Find the surface area of a sphere with volume 288π m^3. Give your answer in terms of π.

$288\pi = \left(\frac{4}{3}\right)\pi r^3$

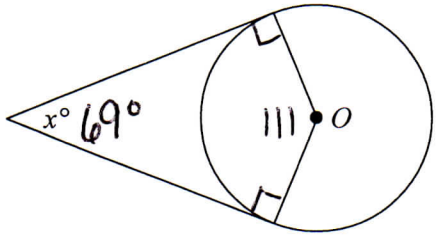
$216 = r^3$

$r = 6$

$4\pi(6^2) = 144\pi$ m^2

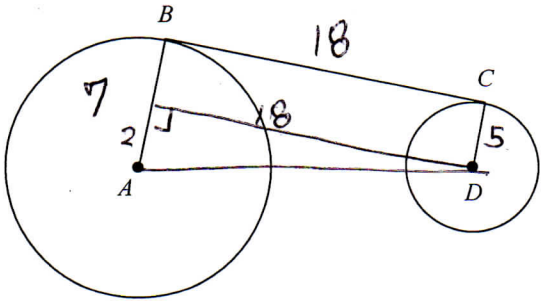
Assume that lines that appear to be tangent are tangent. *O* is the center of the circle. Find the value of *x*. (Figures are not drawn to scale.)

____ 76. $m\angle O = 111$



$360 - 90 - 90 - 111 = 69°$

____ 77. $\overline{BC}$ is tangent to circle *A* at *B* and to circle *D* at *C* (not drawn to scale). $AB = 7$, $BC = 18$, and $DC = 5$. Find AD to the nearest tenth.

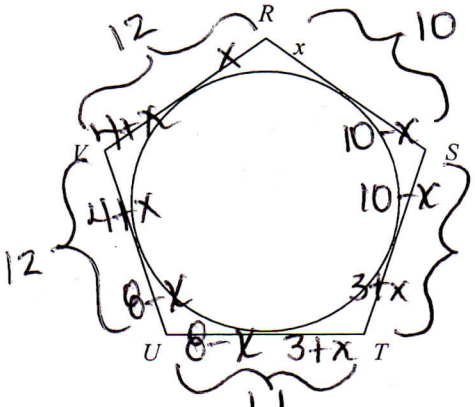


$2^2 + 18^2 = c^2$

$\sqrt{328} = c$

$18.11 = c$

____ 78. Pentagon *RSTUV* is circumscribed about a circle. Solve for *x* for $RS = 10$, $ST = 13$, $TU = 11$, $UV = 12$, and $VR = 12$. The figure is not drawn to scale.



$12 - (8 - x)$

$4 + x$

$11 - (3 + x)$

$8 - x$

$13 - (10 - x)$

$3 + x$

$4 + x + x = 12$

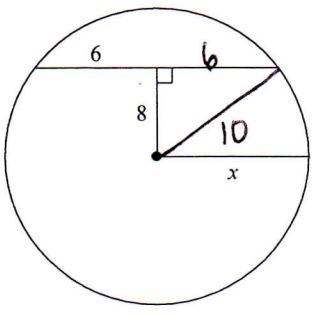
$4 + 2x = 12$

$2x = 8$

$x = 4$

Find the value of *x*. If necessary, round your answer to the nearest tenth. The figure is not drawn to scale.

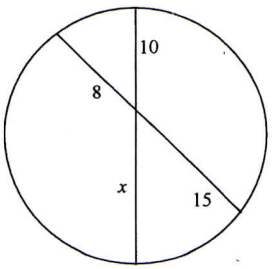
____ 79.



Pythagorean Triple!

$x = 10$

___ 80.

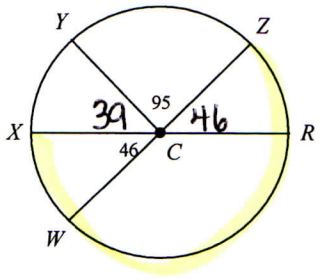


$10x = 8(15)$

$10x = 120$

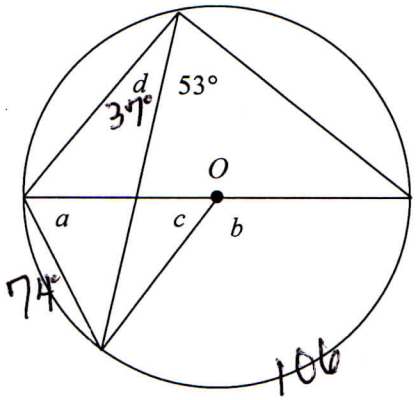
$x = 12$

___ 81. $\overline{WZ}$ and $\overline{XR}$ are diameters. Find the measure of arc ZWX. (The figure is not drawn to scale.)



$180 + 46 = 226°$

___ 82. Find the measures of the indicated angles. ~~Which statement is NOT true? (The figure is not drawn to scale.)~~



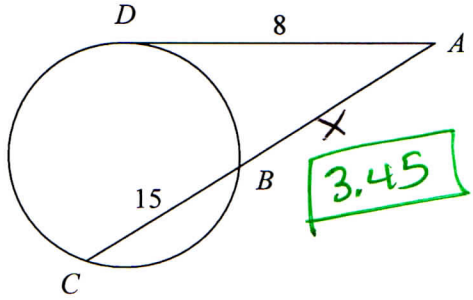
$a = 53°$

$d = 37°$

$c = 74°$

$b = 106°$

___ 83. Find AB. Round to the nearest tenth if necessary.



3.45

$8^2 = (x+15)x$

$64 = x^2 + 15x$

$0 = x^2 + 15x - 64$

Quad

$a=1$, $b=15$, $c=-64$

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$\frac{-15 \pm \sqrt{15^2 - 4 \cdot 1 \cdot -64}}{2}$$

$$\frac{-15 \pm \sqrt{481}}{2}$$

$$= \frac{-15 \pm 21.9}{2}$$

$= 3.45$ or -18.45 can't be neg

Write the standard equation for the circle.

___ 84. center $(2, 7)$, $r = 4$ (h, k)

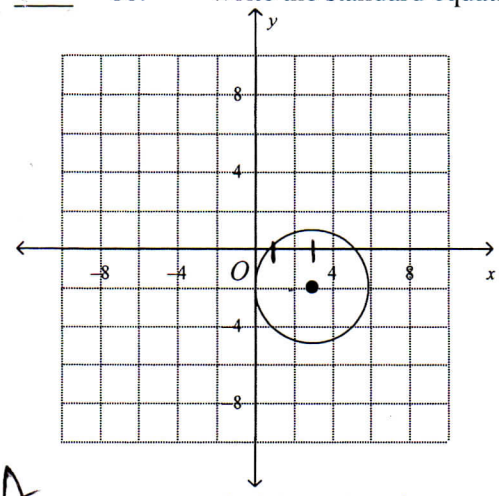
$(x-h)^2 + (y-k)^2 = r^2$

$(x-2)^2 + (y-7)^2 = 16$

___ 85. Find the ~~center and radius of the circle~~ with equation $(x+9)^2 + (y+5)^2 = 64$. (h, k)

$C(-9, -5)$ $r = \sqrt{64} = 8$

____ 86. Write the standard equation of the circle in the graph.

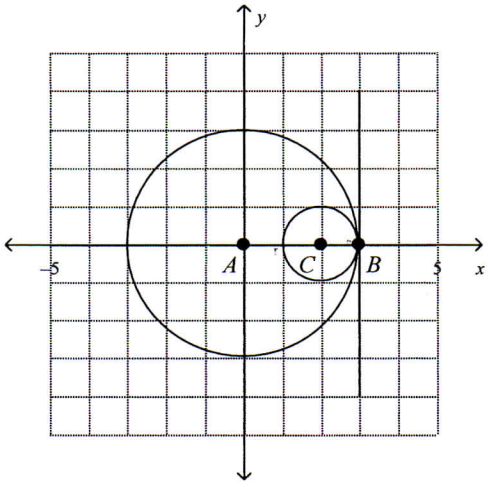


Center $(3,-2)$

$r = 3$

$\boxed{(x-3)^2+(y+2)^2=9}$

A ____ 87. Find the point of tangency and write the equation of the tangent line at this point.



Point of tangency $(3,0)$

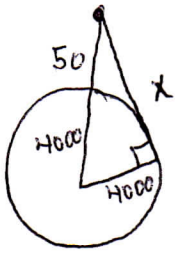
equation of line $\boxed{x=3}$

a. point of tangency: $B(3, 0)$;
equation of the tangent line: $x = 3$

b. point of tangency: $B(3, 0)$;
equation of the tangent line: $y = 3$

c. point of tangency: $C(2, 0)$;
equation of the tangent line: $x + y = 3$

d. point of tangency: $A(0, 0)$;
equation of the tangent line: $y = x + 3$



$x^2 + 4000^2 = 4050^2$

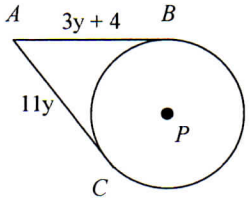
$x^2 = 4050^2 - 4000^2$

$x^2 = 402500$

$\boxed{x = 634.43 \text{ miles}}$

____ 88. A satellite rotates 50 miles above Earth's atmosphere. An astronaut works on the satellite and sees the sun rise over Earth. To the nearest mile, what is the distance from the astronaut to the horizon? (*Hint*: Earth's radius is about 4,000 miles.)

____ 89. $\overline{AB}$ and $\overline{AC}$ are tangent to $\odot P$. Find AB.



$11y = 3y + 4$

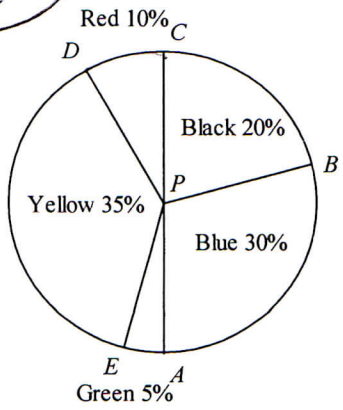
$8y = 4$

$y = \frac{4}{8} = \frac{1}{2}$

$AB = 3\left(\frac{1}{2}\right) + 4 = 5.5$

36°

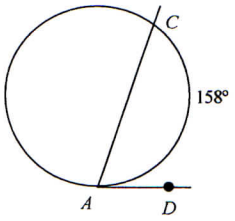
90. The circle graph shows the colors of automobiles sold at a car dealership. Find m(arc)CD.



(.10) 360 =

A

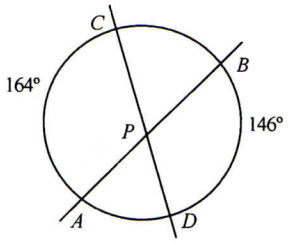
91. Find m$\angle CAD$.



$\frac{158}{2} = 79°$

a. m$\angle CAD$ = 79°
b. m$\angle CAD$ = 158°
c. m$\angle CAD$ = 90°
d. m$\angle CAD$ = 89°

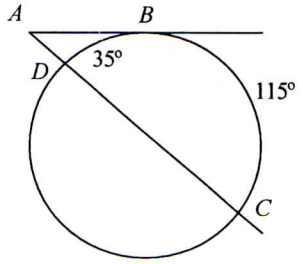
____ 92. Find m$\angle BPD$.



155

$\frac{164 + 146}{2} =$

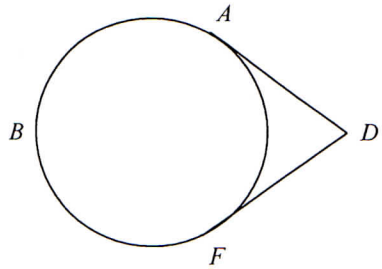
____ 93. Find m$\angle A$.



$\frac{115 - 35}{2} =$ 40

A

94. Two of the muscles that control eye movement are attached to the eyeball and intersect behind the eye as shown. If **m(arc)**ABF = 300°, what is **m**$\angle ADF$?

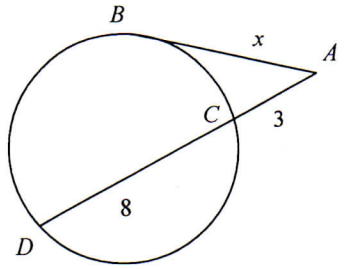


360 - 300 = 60

$\frac{300 - 60}{2} = 4$

a. m$\angle ADF$ = 120°
b. m$\angle ADF$ = 60°
c. m$\angle ADF$ = 240°
d. m$\angle ADF$ = 30°

95. Find the value of x. Round to the nearest hundredth.



$x^2 = 3(3+8)$

$x^2 = 33$

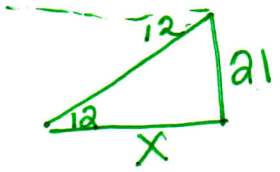
$x = 5.74$

96. A forest ranger spots a fire from a 21-foot tower. The angle of depression from the tower to the fire is 12°.

a. Draw a diagram to represent this situation.

b. To the nearest foot, how far is the fire from the base of the tower? Show the steps you use to find the solution.

99ft

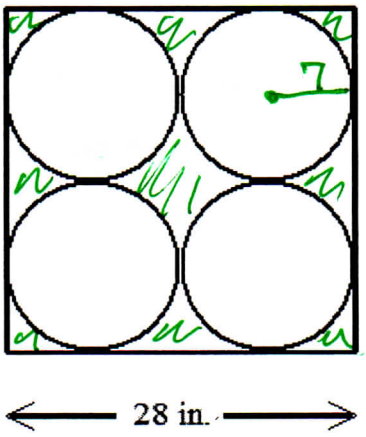


$\tan 12 = \frac{21}{x}$ $\quad x = \frac{21}{\tan 12}$

$x = 98.8$

≈ 99 ft

97. In the given figure, what is the area outside the circles but inside the square? Express your answers in terms of π.



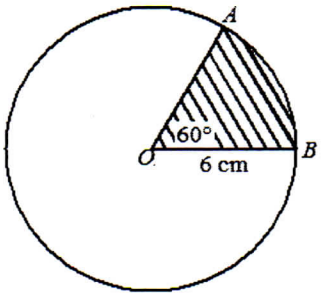
$A_{sq} - A_{\odot s}$

$28 \cdot 28$

$784 - 4(7^2\pi)$

$784 - 196\pi$

98. Find the area of the shaded region. Express your answer in terms of π.

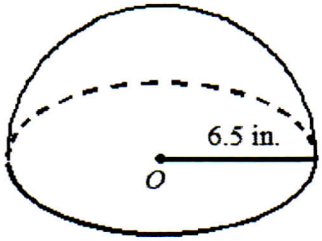


$\frac{60}{360} \cdot \pi r^2$

$\frac{1}{6} \cdot \pi \cdot 36$

6π

99. Find the surface area and volume of the hemisphere. Leave in terms of π.



SA = ½ sphere + Great ⊙

$= 3\pi r^2$

$3\pi 6.5^2$

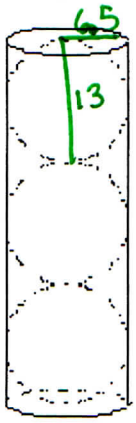
$SA = 126.75\pi$

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

$\frac{2}{3}\pi \cdot 6.5^3$

$V = 183.1\pi$

100. Three balls are packaged in a cylindrical container as shown below. The balls just touch the top, bottom, and sides of the cylinder. The diameter of each ball is 13 cm.



$V_{cyl} = \pi r^2 h$

$r = 6.5$

$h = 39$

$\pi \cdot 6.5^2 \cdot 39$

a) 1647.75π

$V_{balls} = \left(\frac{4}{3}\pi r^3\right) 3$ ← 3 of them

$= 4\pi \cdot 6.5^3$

b) $= 1098.5\pi$

c) $\frac{1098.5\pi}{1647.75\pi}$

$\approx .67 = 67\%$

a. What is the volume of the cylinder? Explain your method for finding the volume.

b. What is the total volume of the three balls? Explain your method for finding the total volume.

c. What percent of the volume of the container is occupied by the three balls? Explain how you find the percent.

Total area of balls / Total area