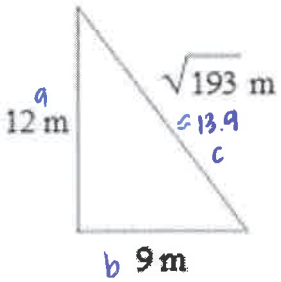
Geometry (A)
Final Review Packet

Name : Key
Date : _____ Period : ____

Unit 5 - Right Triangles

For questions #1-4, determine if the triangle is acute, right, or obtuse. **(Sec. 7.2)**

1)



$c^2 = a^2 + b^2$

$(\sqrt{193})^2 = 12^2 + 9^2$

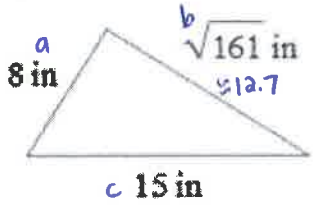
$193 = 144 + 81$

$193 < 225$

$c^2 < a^2 + b^2$

acute

2)



$c^2 = a^2 + b^2$

$15^2 = 8^2 + (\sqrt{161})^2$

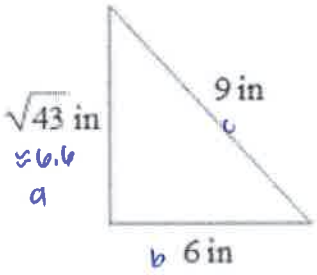
$225 = 64 + 161$

$225 = 225$

$c^2 = a^2 + b^2$

right

3)



$c^2 = a^2 + b^2$

$9^2 = (\sqrt{43})^2 + 6^2$

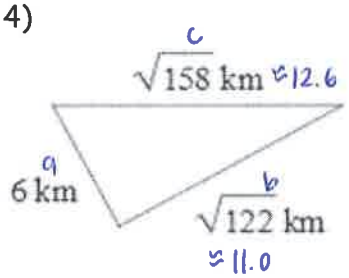
$81 = 43 + 36$

$81 > 79$

$c^2 > a^2 + b^2$

obtuse

4)



$c^2 = a^2 + b^2$

$(\sqrt{158})^2 = 6^2 + (\sqrt{122})^2$

$158 = 36 + 122$

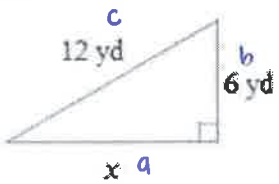
$158 = 158$

$c^2 = a^2 + b^2$

right

For #5-10, find the missing side or sides of the triangle. Leave your answer in simplest radical form. **(#5-6 Sec 7.1; #7-10 Sec 7.4)**

5)



$a^2 + b^2 = c^2$

$x^2 + 6^2 = 12^2$

$x^2 + 36 = 144$

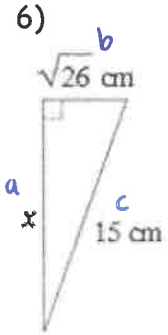
$x^2 = 108$

$x = \sqrt{108}$

$x = \sqrt{36}\sqrt{3}$

$x = 6\sqrt{3}$

6)



$a^2 + b^2 = c^2$

$x^2 + (\sqrt{26})^2 = 15^2$

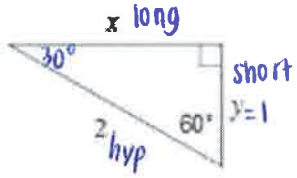
$x^2 + 26 = 225$

$x^2 = 199$

$x = \sqrt{199}$

#7-10 Special Right Triangles

7)

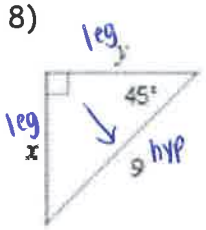


hyp = short · 2 $\qquad$ long = short $\sqrt{3}$

$\frac{2}{2} = \frac{y \cdot 2}{2}$ $\qquad$ $x = 1\sqrt{3}$

$\boxed{y = 1}$ $\qquad$ $\boxed{x = \sqrt{3}}$

8)



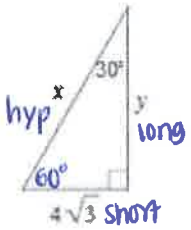
hyp = leg $\sqrt{2}$

$\frac{9}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$

$x = \frac{9}{\sqrt{2}}$ pop & drop $= \boxed{\frac{9\sqrt{2}}{2} = x}$ $\qquad$ $\boxed{y = \frac{9\sqrt{2}}{2}}$

both legs are congruent

9)



hyp = short · 2

$x = 4\sqrt{3} \cdot 2$

$\boxed{x = 8\sqrt{3}}$

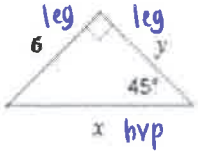
long = short · $\sqrt{3}$

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

$y = 4\sqrt{9}$

$y = 4(3) \Rightarrow \boxed{y = 12}$

10)



hyp = leg $\sqrt{2}$

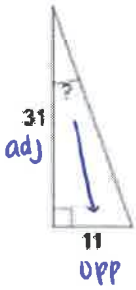
$\boxed{x = 6\sqrt{2}}$

Legs are congruent so

$\boxed{y = 6}$

Find the indicated angle to the nearest degree. **(Sec 7.7)**

11)

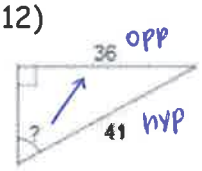


$\tan x = \frac{11}{31}$

$x = \tan^{-1}\left(\frac{11}{31}\right)$

$\boxed{x = 19.5^\circ}$

12)

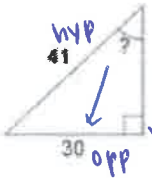


$\sin x = \frac{36}{41}$

$x = \sin^{-1}\left(\frac{36}{41}\right)$

$\boxed{x = 61.4^\circ}$

13)

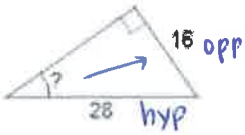


$\sin x = \frac{30}{41}$

$x = \sin^{-1}\left(\frac{30}{41}\right)$

$\boxed{x = 47.0^\circ}$

14)



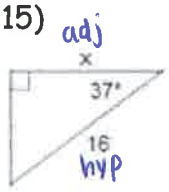
$\sin x = \frac{16}{28}$

$x = \sin^{-1}\left(\frac{16}{28}\right)$

$\boxed{x = 34.8^\circ}$

sine, cosine, tangent

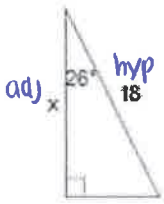
Find the missing side. Round to the nearest tenth. (Sec 7.5-7.6)

15) 

$\frac{\cos 37}{1} = \frac{x}{16}$

$x = 16\cos 37$

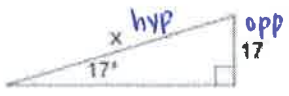
$\boxed{x = 12.8}$

16) 

$\frac{\cos 26}{1} = \frac{x}{18}$

$x = 18\cos 26$

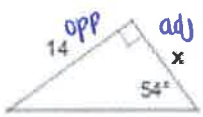
$\boxed{x = 16.2}$

17) 

$\frac{\sin 17}{1} = \frac{17}{x}$

$\frac{17}{\sin 17} = \frac{x \sin 17}{\sin 17}$

$x = \frac{17}{\sin 17} = \boxed{58.1}$

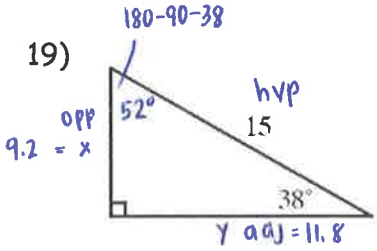
18) 

$\frac{\tan 54}{1} = \frac{14}{x}$

$\frac{14}{\tan 54} = \frac{x \tan 54}{\tan 54}$

$x = \frac{14}{\tan 54} = \boxed{10.2}$

Solve the triangle and find the area of each triangle below. (Sec 7.7)

19) 

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(11.8)(9.2)$

$\boxed{A = 54.3 \text{ units}^2}$

$\frac{\sin 38}{1} = \frac{x}{15}$

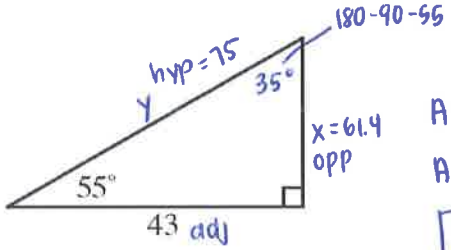
$x = 15\sin 38$

$x = 9.2$

$\frac{\cos 38}{1} = \frac{y}{15}$

$y = 15\cos 38$

$y = 11.8$

20) 

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(43)(61.4)$

$\boxed{A = 1320.1 \text{ units}^2}$

$\frac{\tan 55}{1} = \frac{x}{43}$

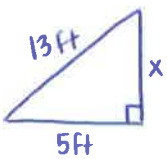
$x = 43\tan 55$

$x = 61.4$

$\frac{\cos 55}{1} = \frac{43}{y}$

$\frac{43}{\cos 55} = \frac{y\cos 55}{\cos 55} \Rightarrow y = 75$

21) **Ladder** A ladder is leaning against a house. The ladder is 13 feet long and the foot of the ladder is 5 feet away from the base of the house. How far up the side of the house does the ladder reach? (Sec 7.1)



$x^2 + 5^2 = 13^2$

$x^2 + 25 = 169$

$x^2 = 144$

$x = 12$

The ladder reaches 12 ft up the side of the building

Decide if the segment lengths form a triangle. If so, would the triangle be *acute*, *right*, or *obtuse*. (Sec 7.2)

22) $7, 9, \sqrt{130}$ (a b c: 7, 9, $\sqrt{130}$)

$a+b>c$: $7+9>11.4$

$b+c>a$: $9+11.4>7$

$a+c>b$: $7+11.4>9$

$c^2 = a^2 + b^2$

$(\sqrt{130})^2 = 7^2 + 9^2$

$130 = 49 + 81$

$130 = 130$

$c^2 = a^2 + b^2 \Rightarrow$ Right

23) $5, 13, 20$ (a b c: 5, 13, 20)

$a+b>c$: $5+13>20$

$\times$

not a triangle

24) $13, 19, 29$ (a b c: 13, 19, 29)

$a+b>c$: $13+19>29$

$b+c>a$: $19+29>13$

$a+c>b$: $13+29>19$

$c^2 = a^2 + b^2$

$29^2 = 13^2 + 19^2$

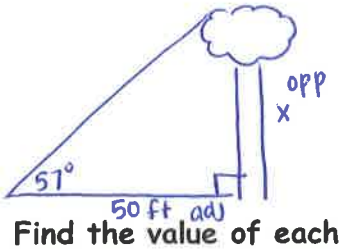
$841 = 169 + 361$

$841 = 530$

$c^2 > a^2 + b^2$

Obtuse

25) **Tree height** A biologist is standing 50 feet from the base of a large oak tree. The biologist measures the angle of elevation of the tree to be 57°. Find the height h of the oak tree to the nearest foot. **(Sec 7.5-7.6)**



$\frac{\tan 57}{1} = \frac{x}{50}$

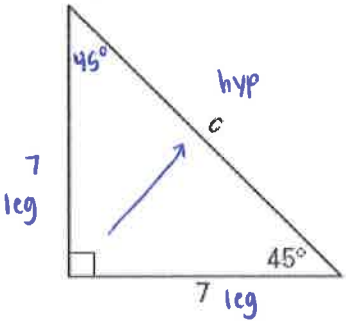
$x = 50 \tan 57$

$x = 77$

The tree is 77 ft tall

Find the value of each variable. Write your answers in simplest radical form. (Sec 7.4)

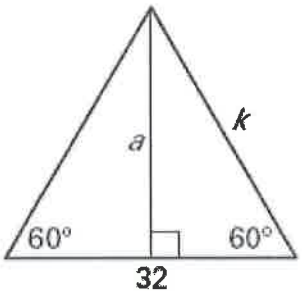
26)

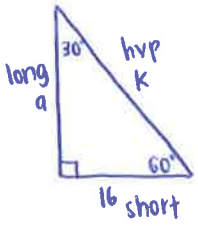


hyp = leg $\sqrt{2}$

$c = 7\sqrt{2}$

27)





hyp = short · 2

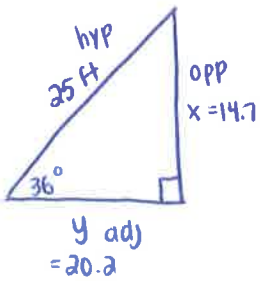
$K = 16 \cdot 2$

$K = 32$

long = short · $\sqrt{3}$

$a = 16\sqrt{3}$

28) You need to determine the area of a garden which is in the shape of a right triangle. The hypotenuse measures 25 feet and one of the acute angles measures 36°. Round your answer to the nearest tenth. **(Sec 7.5-7.6)**



$\frac{\sin 36}{1} = \frac{x}{25}$

$x = 25 \sin 36$

$x = 14.7$

$\frac{\cos 36}{1} = \frac{y}{25}$

$y = 25 \cos 36$

$y = 20.2$

$A = \frac{1}{2} bh$

$A = \frac{1}{2}(20.2)(14.7)$

$A = 148.5 \text{ ft}^2$

Unit 5.5 – Congruence Transformations

29) Given point A is located at (1 , 3), what is the final image of A after this series of transformations?

(1) Reflect A across the y-axis $(x,y) \rightarrow (-x, y)$

(2) Translate the image such that $(x , y) \rightarrow (x - 4, y + 2)$

$(x,y) \rightarrow (-x,y) \rightarrow (x-4, y+2)$

$(1,3) \rightarrow (-1,3) \rightarrow \boxed{(-5,5)}$

30) Graph ΔLMN with vertices L(3,-1), M(1, -5), and N(4, -3).

a. What are the coordinates of L', M', and N' after a counterclockwise rotation of 180 degrees?

Rule: $(x,y) \rightarrow (-x,-y)$

$L(3,-1) \rightarrow L'(-3,1)$

$M(1,-5) \rightarrow M'(-1,5)$

$N(4,-3) \rightarrow N'(-4,3)$

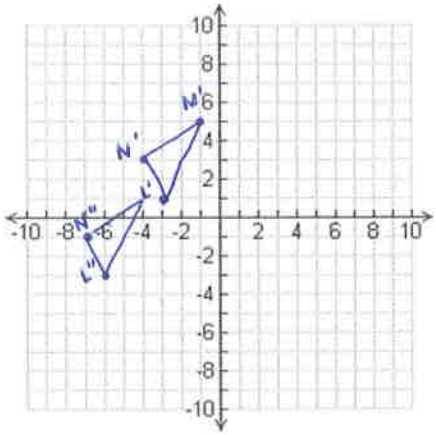
b. Take the image from part a and perform the translation $(x, y) \rightarrow (x - 3, y - 4)$. What are the coordinates of L", M" and N"?

$(x,y) \rightarrow (x-3, y-4)$

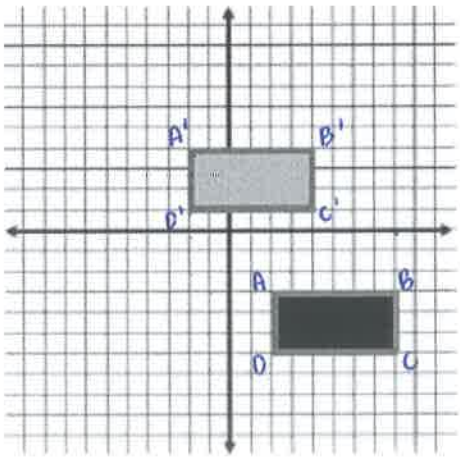
$L'(-3,1) \rightarrow (-6,-3) L''$

$M'(-1,5) \rightarrow (-4,1) M''$

$N'(-4,3) \rightarrow (-7,-1) N''$



31) What transformation will map the darker figure onto the lighter figure? Give the proper notation.



$A(2,-3) \rightarrow A'(-2,4)$

$B(8,-3) \rightarrow B'(4,4)$

$C(8,-6) \rightarrow C'(4,1)$

$D(2,-6) \rightarrow D'(-2,1)$

$\boxed{(x,y) \rightarrow (x-4, y+7)}$

$(x,y) \rightarrow (-y, x)$

32) The point A(4, 3) is rotated 90 degrees counterclockwise about the origin. What are the coordinates of the image?

$A(4,3) \rightarrow \boxed{A'(-3,4)}$

33) Identify the coordinates of (10, -20) after a 270° counter-clockwise rotation about the origin.

$(x,y) \rightarrow (y,-x)$

$(10,-20) \rightarrow \boxed{(-20,-10)}$

34) Given that point B is located at (1,2), where does the image of point B end up after the following transformations?
First a transformation using the rule (x,y) → (x + 2, y - 4) followed immediately by a reflection over the line y = x. **[2]**

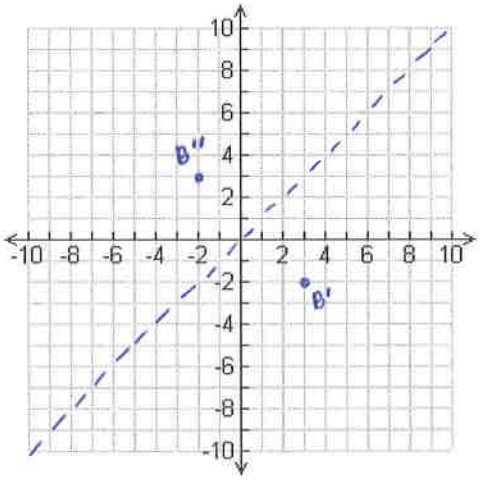
$(1,2) \rightarrow (1+2, 2-4)$

Translation (x,y) → (x + 2, y - 4): B' $(3,-2)$

reflection over the line y = x: B'' $(-2,3)$

$(x,y) \rightarrow (y,x)$

$(3,-2) \rightarrow (-2,3)$



Unit 6 - Polygons

$(n-2)\cdot 180$

Find the sum of the measures of the interior angles of the indicated convex polygon. (#35-45 Sec 8.1)

$n=13$

35) 13-gon

$(13-2)\cdot 180$

$(11)\,180 = \boxed{1980^\circ}$

36) Octagon $n=8$

$(8-2)\cdot 180$

$(6)\cdot 180 = \boxed{1080^\circ}$

37) 22-gon $n=22$

$(22-2)\cdot 180$

$(20)\cdot 180 = \boxed{3600^\circ}$

38) Pentagon $n=5$

$(5-2)\cdot 180$

$(3)\cdot 180 = \boxed{540^\circ}$

Sum of interior = $(n-2)\cdot 180$

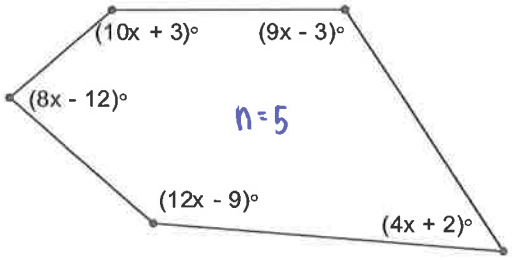
$(5-2)\cdot 180$

$(3)\cdot 180$

$= 540°$

39) In the figure at the right,

a.) What is the value of x? *(Section 8.1)*



$n = 5$

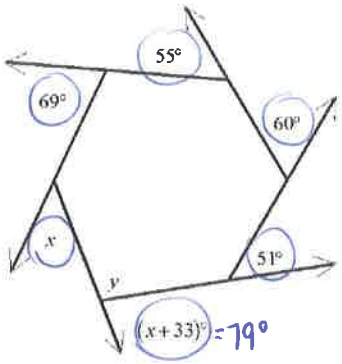
$43x - 19 = 540$

$43x = 559 \Rightarrow \boxed{x = 13}$

b.) Find the sum of the measures of the exterior angles, one at each vertex.

All exterior angles sum to $\boxed{360°}$

40) Find the values of x and y. Total exterior measure = 360°



$69 + 55 + 60 + 51 + x + 33 + x = 360$

$2x + 268 = 360$

$2x = 92$

$\boxed{x = 46}$

$(x+33)° = 79°$

$y + 79 = 180$ (Linear Pair)

$\boxed{y = 101}$

Find the measure of each exterior angle in the following regular polygon. $\frac{360}{n}$

41) Quadrilateral $n = 4$

$\frac{360}{n} = \frac{360}{4} = \boxed{90°}$

42) Octagon $n = 8$

$\frac{360}{n} = \frac{360}{8} = \boxed{45°}$

Find the value of n for each regular n-gon described.

43) Each interior angle of the regular n-gon has a measure of 165°.

$\boxed{n = 24}$

$\text{int} = \frac{(n-2)\cdot 180}{n}$

$\frac{165}{1} = \frac{(n-2)\cdot 180}{n}$

$165n = (n-2)\cdot 180$

$165n = 180n - 360$

$-15n = -360$

$n = 24$

44) Each exterior angle of the regular n-gon has a measure of 60°.

$\text{ext} = \frac{360}{n} \Rightarrow \frac{60}{1} = \frac{360}{n} \Rightarrow 360 = 60n$

$\boxed{n = 6}$

45) The sum of the interior angles of the regular n-gon is 2700°.

$\text{Sum} = (n-2)\cdot 180$

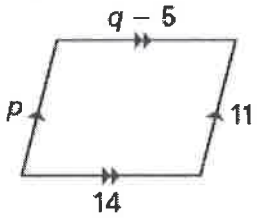
$2700 = (n-2)\cdot 180$

$2700 = 180n - 360$

$3060 = 180n \Rightarrow \boxed{n = 17}$

Find the values of each variable in the parallelogram. **(#46-49 Sec 8.2)**

46)



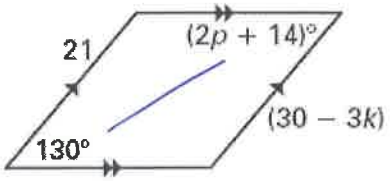
$q-5=14$

$\boxed{q=19}$

$\boxed{p=11}$

Opp. sides in a p-gram are $\cong$

47)



$21=30-3K$

$-9=-3K$

$\boxed{K=3}$

Opp sides are $\cong$

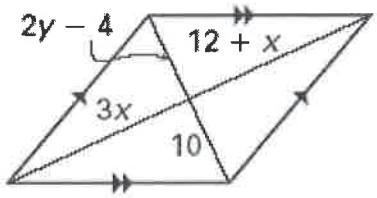
$130=2p+14$

$116=2p$

$\boxed{p=58}$

Opp angles are $\cong$

48)



$2y-4=10$

$2y=14$

$\boxed{y=7}$

$12+x=3x$

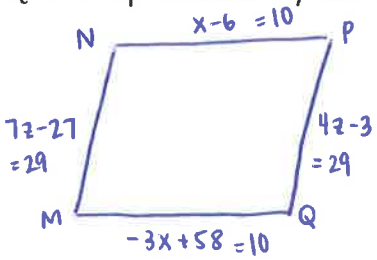
$12=2x$

$\boxed{x=6}$

diagonals bisect each other

49) The sides of $\square MNPQ$ are represented by the expressions below. Sketch $\square MNPQ$ and find its perimeter.

$MQ = -3x + 58$
$QP = 4z - 3$
$NP = x - 6$
$MN = 7z - 27$



$x-6=-3x+58$

$4x-6=58$

$4x=64$

$\boxed{x=16}$

$7z-27=4z-3$

$3z-27=-3$

$3z=24$

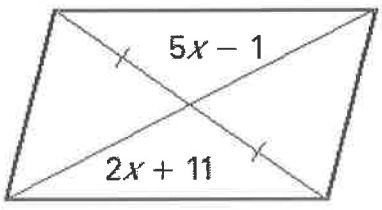
$\boxed{z=8}$

Opp sides are congruent

Perimeter $= 29+29+10+10 =$ $\boxed{78 \text{ units} = P}$

For what value of x is the quadrilateral a parallelogram? **(Sec 8.3)**

50)



$5x-1=2x+11$

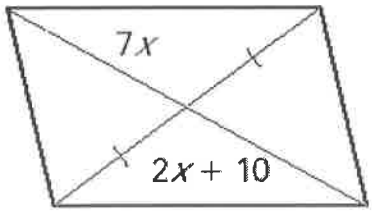
$3x-1=11$

$3x=12$

$\boxed{x=4}$

diagonals bisect each other

51)



$7x=2x+10$

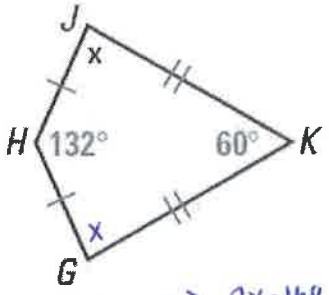
$5x=10$

$\boxed{x=2}$

diagonals bisect each other

For the kites below, please solve find the value of x. **(#52-55 Sec 8.5)**

52)



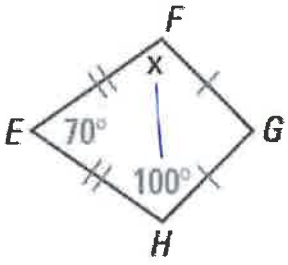
$x+x+132+60 = 360$

$2x+192 = 360$

$2x = 168$

$x = 84°$

54)



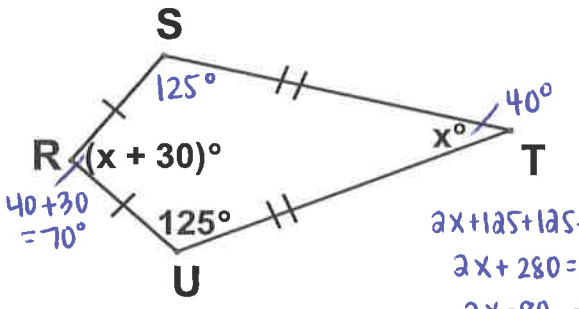
$x = 100°$

55) Given the kite shown below, find:

a.) m∠R 70°

b.) m∠S 125°

c.) m∠T 40°



$2x+125+125+30 = 360$

$2x+280 = 360$

$2x = 80 \Rightarrow x = 40$

The diagonals of rhombus *ABCD* intersect at *E*. Given that $m\angle BAC = 50°$, $AD = 13$, and $DE = 10$, find the indicated measure. **(Sec 8.4)**

56) $m\angle ABE$ = 40°

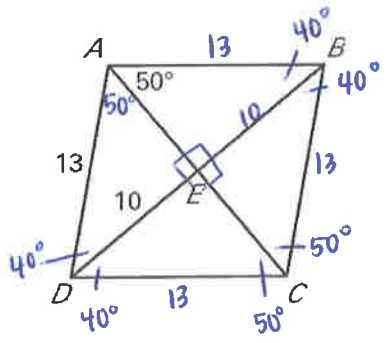
57) $m\angle DEC$ = 90°

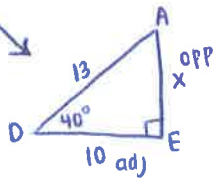
58) DB = 10+10 = 20

59) AE = 8.4

60) $m\angle DAC$ = 50°

61) BC = 13





$\frac{\tan 40}{1} = \frac{x}{10}$

$x = 10\tan 40$

$x = 8.4$

62) Use the diagram of the parallelogram MNOP at the right to complete each statement. Explain. **(Sec 8.2)**

a) $\overline{MN} \cong$ $\overline{OP}$ opp sides are $\cong$

b) $\overline{ON} \cong$ $\overline{MP}$ opp sides are $\cong$

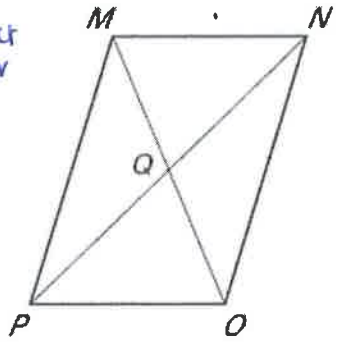
c) $\overline{PQ} \cong$ $\overline{QN}$ diagonals bisect each other

d) $\angle MQN \cong$ $\angle OQP$ vertical angles

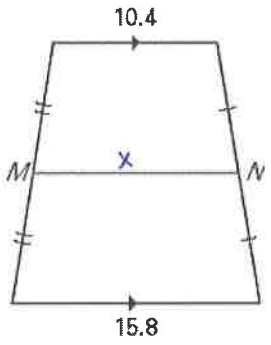
e) $\overline{MN} \parallel$ $\overline{OP}$ opp sides are $\parallel$

f) $\overline{MQ} \cong$ $\overline{OQ}$ diagonals bisect each other

g) $\angle NPO \cong$ $\angle PNM$ alternate interior angles



63) Find the length of the midsegment of the trapezoid. **(Sec 8.5)**



midseg $= \frac{1}{2}(base_1 + base_2)$

$x = \frac{1}{2}(10.4 + 15.8)$

$x = \frac{1}{2}(26.2)$

$x = 13.1$

midsegment = 13.1

Points *P*, *Q*, *R*, and *S* are the vertices of a quadrilateral. Give the most specific name for *PQRS*. *Justify* your answer using distance formula, slope formula, midpoint formula. **(Sec 8.6)**

64) $P(-5,2), Q(5,2), R(3,5), S(-3,5)$

Trapezoid:

Parallel Bases $\overline{SR}$ and $\overline{PQ}$:

Slope $\overline{SR} = \frac{5-5}{-3-3} = \frac{0}{-6} = 0$

Slope $\overline{PQ} = \frac{2-2}{-5-5} = \frac{0}{-10} = 0$

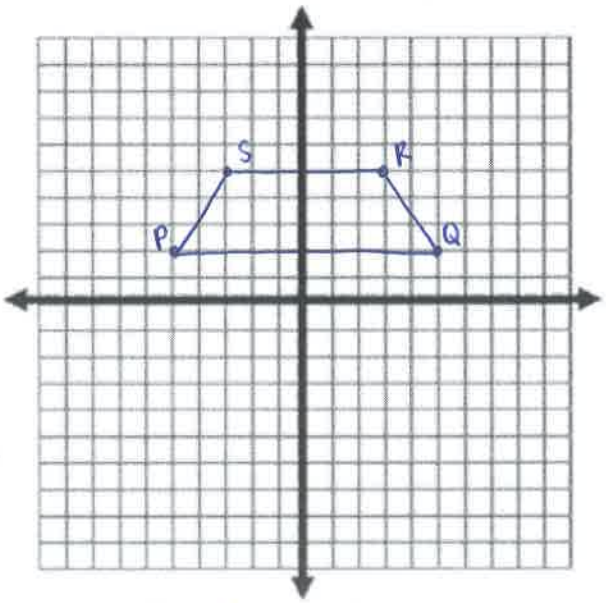
$\Rightarrow \overline{SR} \parallel \overline{PQ}$

Congruent legs? $\overline{SP}$ and $\overline{RQ}$

$SP = \sqrt{(-3--5)^2+(5-2)^2} = \sqrt{(-3+5)^2+(3)^2} = \sqrt{(2)^2+(3)^2} = \sqrt{4+9} = \sqrt{13}$

$RQ = \sqrt{(3-5)^2+(5-2)^2} = \sqrt{(-2)^2+(3)^2} = \sqrt{4+9} = \sqrt{13}$

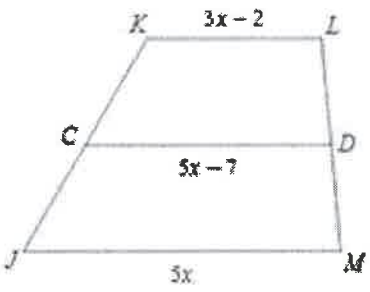
$\overline{SP} \cong \overline{RQ}$



Since bases are $\parallel$ and legs are $\cong$, PQRS is an isosceles trapezoid

midsegment $= \frac{1}{2}(base_1 + base_2)$

65) Find the length of the midsegment of the trapezoid. **(Sec 8.5)**



$CD = 5(6) - 7$

$CD = 23$

$5x - 7 = \frac{1}{2}(3x - 2 + 5x)$

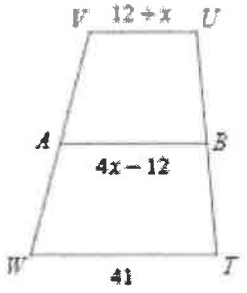
$5x - 7 = \frac{1}{2}(8x - 2)$

$5x - 7 = 4x - 1$

$x - 7 = -1$

$x = 6$

66) Find UV **(Sec 8.5)**



$4x - 12 = \frac{1}{2}(12 + x + 41)$

$4x - 12 = \frac{1}{2}(x + 53)$

$4x - 12 = \frac{1}{2}x + 26.5$

$3.5x - 12 = 26.5$

$3.5x = 38.5$

$x = 11$

$AB = 4(11) - 12$

$AB = 44 - 12$

$AB = 32$

Find the measurement of the angle indicated for each trapezoid. **(Sec 8.5)**

67) Find $m\angle L$ $= 180 - 75.5 =$ $104.5°$

base angles are $\cong$

~~$8x + 9 + 7x + 3 < 180$~~

~~$16x + 12 < 180$~~

~~$16x < 196$~~

~~$x < 12.25$~~

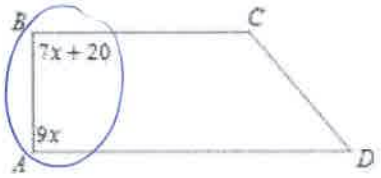
$9x - 19 = 7x + 3$

$2x - 19 = 3$

$2x = 21$

$x = 10.5$

68) Find $m\angle A$



$7x + 20 + 9x = 180$

$16x + 20 = 180$

$16x = 160$

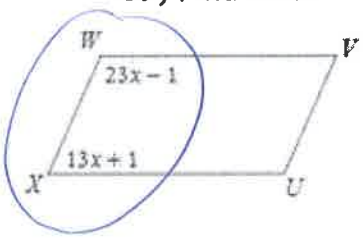
$x = 10$

$m\angle A = 9(10)$

$m\angle A = 90°$

Find the measurement indicated in each parallelogram. **(Sec 8.5)**

69) Find $m\angle W$



Consecutive angles are supplementary

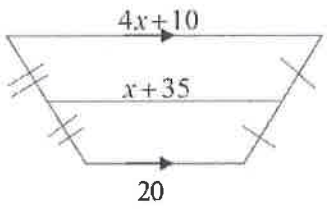
$23x - 1 + 13x + 1 = 180$

$36x = 180$

$x = 5$

70) Find the value of x in the figure

↗ midsegment formula



$x + 35 = \frac{1}{2}(4x + 10 + 20)$

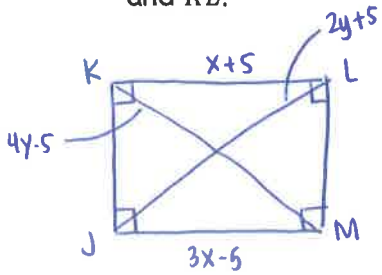
$x + 35 = \frac{1}{2}(4x + 30)$

$x + 35 = 2x + 15$

$35 = x + 15$

$20 = x$

71) If rectangle $JKLM$ has $MK = 4y - 5$, $JL = 2y + 5$, $KL = x + 5$, and $JM = 3x - 5$. Find MK and KL. **(Sec 8.4)**



$x + 5 = 3x - 5$

$5 = 2x - 5$

$10 = 2x$

$x = 5$

$2y + 5 = 4y - 5$

$5 = 2y - 5$

$10 = 2y$

$y = 5$

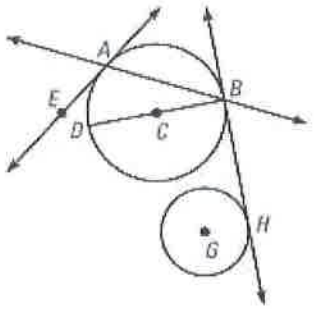
$MK = 4(5) - 5$

$MK = 15$

$KL = 5 + 5$

$KL = 10$

72) Identify each in the diagram.



a. Radius $\overline{CD}$ or $\overline{CB}$

b. Center C or G

c. Tangent $\overleftrightarrow{AE}$

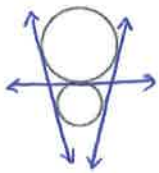
d. Chord $\overline{AB}$

e. Common Tangent $\overleftrightarrow{BH}$

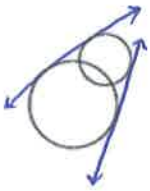
f. Diameter $\overline{DB}$

g. Secant $\overleftrightarrow{AB}$

73) Tell how many common tangents the circles have and draw them.

a. 

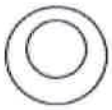
3 common tangents

b. 

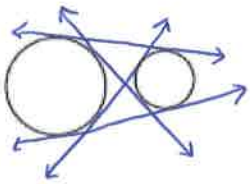
2 common tangents

c. 

1 common tangents

d. 

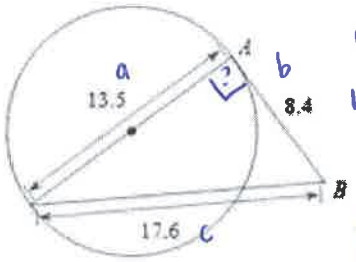
0 common tangents

e. 

4 common tangents

Determine if line AB is tangent to the circle.

74)



$a^2+b^2=c^2$

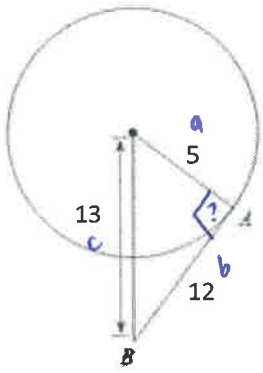
$13.5^2+8.4^2=17.6^2$

$182.25+70.56=309.76$

$252.81=309.76$

Not tangent since $252.81 \neq 309.76$

75)



$a^2+b^2=c^2$

$5^2+12^2=13^2$

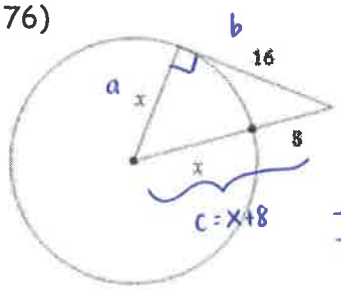
$25+144=169$

$169=169$

Tangent since $169=169$

Solve for x. Assume that lines which appear tangent are tangent.

76)



$a^2+b^2=c^2$

$x^2+16^2=(x+8)^2$

$x^2+256=(x+8)(x+8)$

$x^2+256=x^2+16x+64$

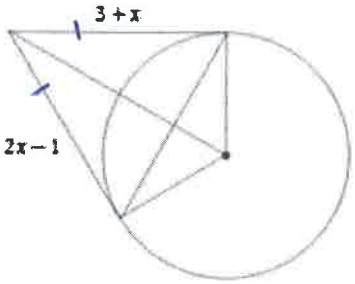
$-x^2 \quad -x^2$

$256=16x+64$

$192=16x$

$x=12$

77)



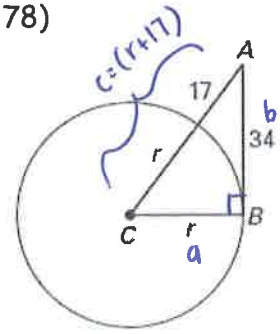
$3+x=2x-1$

$3=x-1$

$x=4$

Find the value(s) of the variable. Points B and D are points of tangency.

78)



$a^2+b^2=c^2$

$r^2+34^2=(r+17)^2$

$r^2+1156=(r+17)(r+17)$

$r^2+1156=r^2+34r+289$

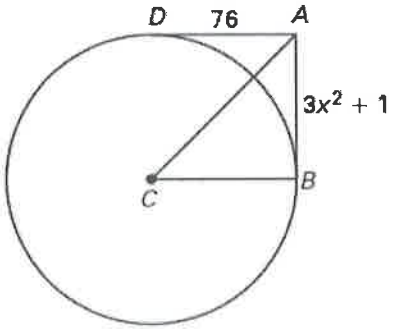
$-r^2 \quad -r^2$

$1156=34r+289$

$867=34r$

$r=25.5$

79)



$76=3x^2+1$

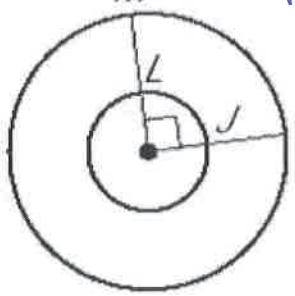
$\frac{75}{3}=\frac{3x^2}{3}$

$25=x^2$

$x=5$ or $x=-5$

Determine whether the given arcs are congruent. *Explain* why or why not. (Sec 10.2)

80) $\overset{\frown}{LJ}, \overset{\frown}{MK}$

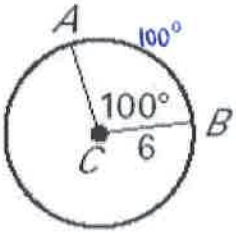


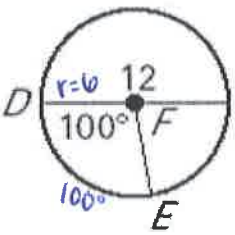
$m\overset{\frown}{LJ} = 90°, m\overset{\frown}{MK} = 90°$

The radii are not $\cong$

not congruent

81) $\overset{\frown}{AB}, \overset{\frown}{DE}$





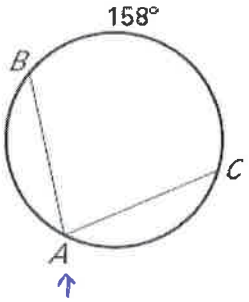
$m\overset{\frown}{AB} = 100°, m\overset{\frown}{DE} = 100°$

radii are congruent

Yes, $\overset{\frown}{AB} \cong \overset{\frown}{DE}$

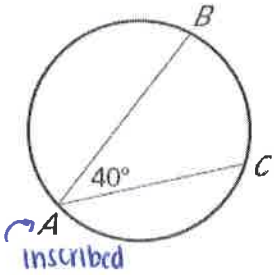
Find the indicated measure. **(#82-86 Sec 10.4)**

82) $m\angle A = \frac{1}{2}(158) =$ 79°



↑ Inscribed angle

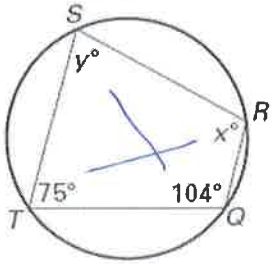
83) $m\overset{\frown}{BC} = 2(40) =$ 80°



Inscribed

Find the value of the variables.

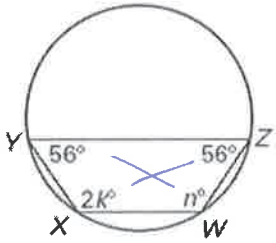
84)



$75 + x = 180$ $\quad$ $y + 104 = 180$

$x = 105$ $\quad$ $y = 76$

85)

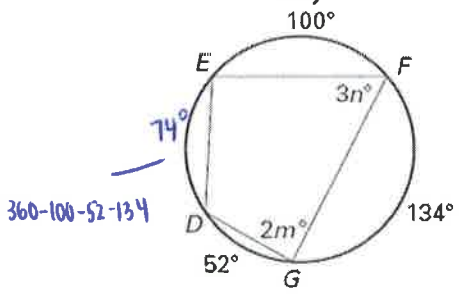


$2k + 56 = 180$ $\quad$ $n + 56 = 180$

$2k = 124$

$k = 62$ $\quad$ $n = 124$

86)



$2m = \frac{1}{2}(74+100)$

$2m = \frac{1}{2}(174)$

$2m = 87$

$\boxed{m = 43.5}$

$3n = \frac{1}{2}(74+52)$

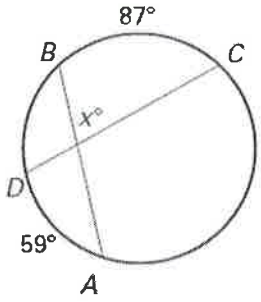
$3n = \frac{1}{2}(126)$

$3n = 63$

$\boxed{n = 21}$

Find the value of x.

87)



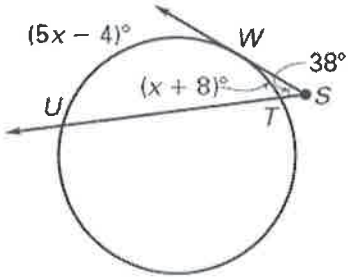
$x = \frac{1}{2}(87+59)$

$x = \frac{1}{2}(146)$

$\boxed{x = 73}$

out = $\frac{1}{2}$(big arc - sm arc)

88) **(#87-88 Sec 10.5)**



$38 = \frac{1}{2}(5x-4-(x+8))$

$38 = \frac{1}{2}(5x-4-x-8)$

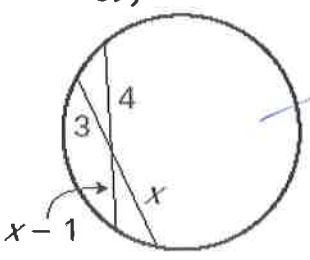
$38 = \frac{1}{2}(4x-12)$

$38 = 2x-6$

$44 = 2x$

$\boxed{x = 22}$

89)



chord/chord

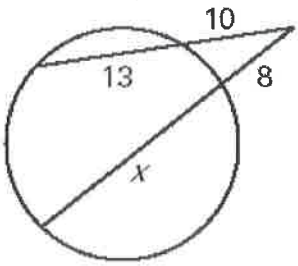
$4(x-1) = 3(x)$

$4x-4 = 3x$

$-4 = -x$

$\boxed{x = 4}$

90)



(#89-91 Sec 10.6)

outside · whole = outside · whole

$10(10+13) = 8(8+x)$

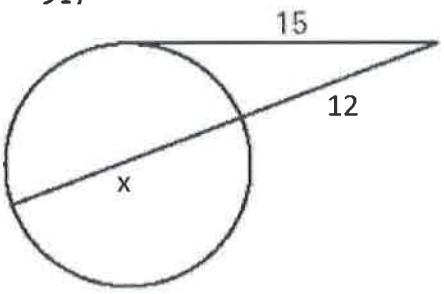
$10(23) = 64+8x$

$230 = 64+8x$

$166 = 8x$

$\boxed{x = 20.75}$

91)



outside · whole = outside · whole

$(15)(15) = 12(12+x)$

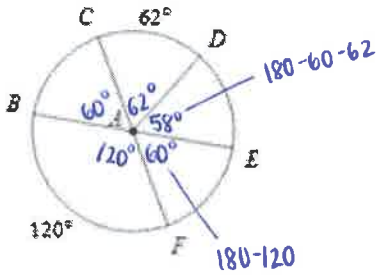
$225 = 144 + 12x$

$81 = 12x$

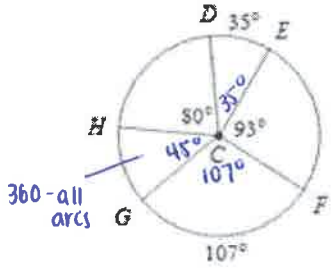
$\boxed{x = 6.75}$

Find the measure of the arc or central angle indicated. Assume that lines which appear to be diameters are actual diameters. (Sec 10.2)

92) $m\angle DAF$



93) $m\angle GCH$



$\boxed{m\angle GCH = 45°}$

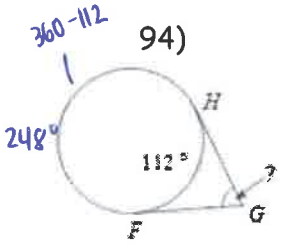
$m\angle DAF = 58 + 60$

$\boxed{m\angle DAF = 118°}$

Find the measure of the arc or angle indicated. Assume that lines which appear to be tangent are tangent. (#94-101 Sec 10.5)

out $= \frac{1}{2}$(big arc − sm arc)

94)

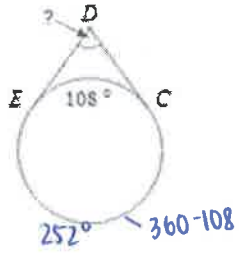


$x = \frac{1}{2}(248 - 112)$

$x = \frac{1}{2}(136)$

$\boxed{x = 68°}$

95)

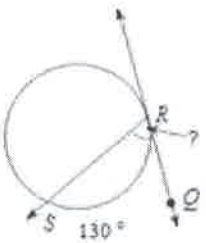


$x = \frac{1}{2}(252 - 108)$

$x = \frac{1}{2}(144)$

$\boxed{x = 72°}$

96)

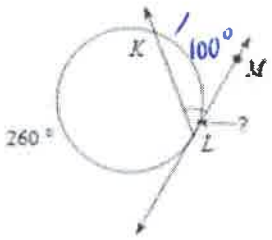


$x = \frac{1}{2}(130)$

$\boxed{x = 65°}$

97)

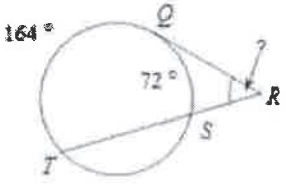
360 - 260



$x = \frac{1}{2}(100)$

$\boxed{x = 50°}$

98)

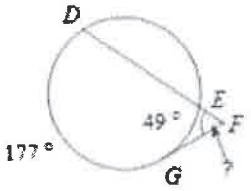


$x = \frac{1}{2}(164 - 72)$

$x = \frac{1}{2}(92)$

$\boxed{x = 46°}$

99)

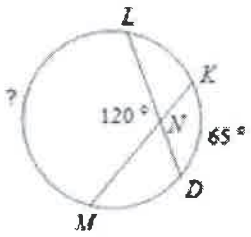


$x = \frac{1}{2}(177 - 49)$

$x = \frac{1}{2}(128)$

$\boxed{x = 64°}$

100)



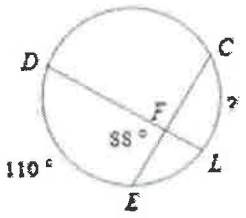
$120 = \frac{1}{2}(x + 65)$

$120 = 0.5x + 32.5$

$87.5 = 0.5x$

$\boxed{x = 175°}$

101)



$88 = \frac{1}{2}(110 + x)$

$88 = 55 + 0.5x$

$33 = 0.5x$

$\boxed{x = 66}$

102) Suppose a space shuttle is orbiting about 180 miles above Earth. What is the distance d from the shuttle to the horizon? The radius of Earth is about 4000 miles. Round your answer to the nearest tenth. **(Sec 10.1)**

$a^2 + b^2 = c^2$

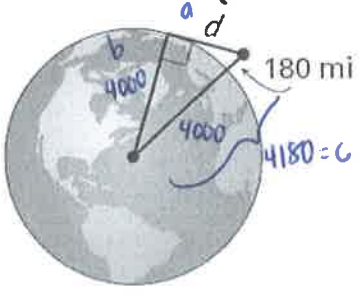
$d^2 + 4000^2 = 4180^2$

$d^2 + 16000000 = 17472400$

$d^2 = 1472400$

$d = 1213.4$

$\boxed{d = 1213.4 \text{ miles}}$



Use the given information to write the standard equation of the circle.

(#103-111 Sec 10.7)

103) The center is $(-3, 2)$ and a point on the circle is $(5, 2)$.

x_1, y_1 x_2, y_2

radius $= \sqrt{(5+3)^2+(2-2)^2} = \sqrt{(8)^2+(0)^2} = \sqrt{64} = 8$

h k r

center $(-3, 2)$ radius $= 8$

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

$\boxed{(x+3)^2+(y-2)^2=64}$

104) The center is $(6, -1)$ and a point on the circle is $(-1, 6)$.

x_1, y_1 x_2, y_2

radius $= \sqrt{(-1-6)^2+(6--1)^2} = \sqrt{(-7)^2+(7)^2} = \sqrt{49+49} = \sqrt{98}$

center $(6,-1)$ radius $= \sqrt{98}$

$(x-6)^2+(y--1)^2 = \sqrt{98}^2$

$\boxed{(x-6)^2+(y+1)^2=98}$

105) Do the following points fall on the circle with equation $(x-2)^2+(y-6)^2=25$?

a. $(2, 6)$ $(2-2)^2+(6-6)^2 \Rightarrow (0)^2+(0)^2 \Rightarrow$ NO $0 \neq 25$

b. $(5, 10)$ $(5-2)^2+(10-6)^2 \Rightarrow (3)^2+(4)^2 \Rightarrow 9+16 \Rightarrow$ Yes $25 = 25$

c. $(4, 2)$ $(4-2)^2+(2-6)^2 \Rightarrow (2)^2+(-4)^2 \Rightarrow 4+16 \Rightarrow$ NO $20 \neq 25$

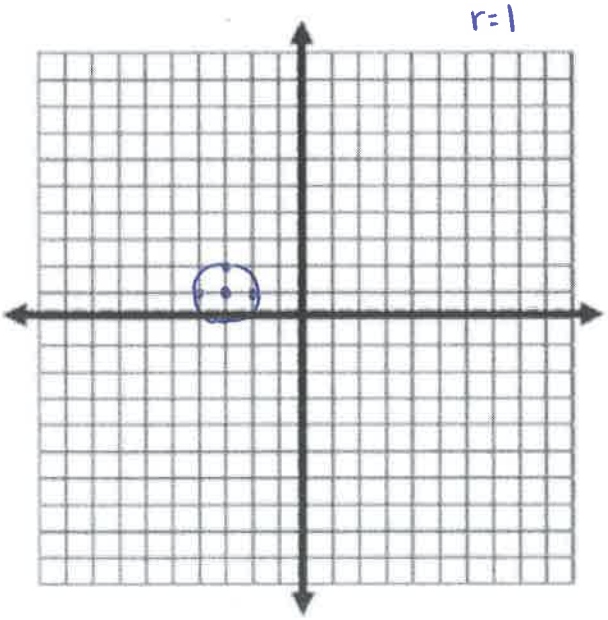
d. $(6, 9)$ $(6-2)^2+(9-6)^2 \Rightarrow (4)^2+(3)^2 \Rightarrow 16+9 \Rightarrow$ Yes, $25 = 25$

Identify the center and radius of each circle. Then sketch the graph.

106) $(x+3)^2+(y-1)^2=1$

center $(-3, 1)$ radius: $r^2=1$

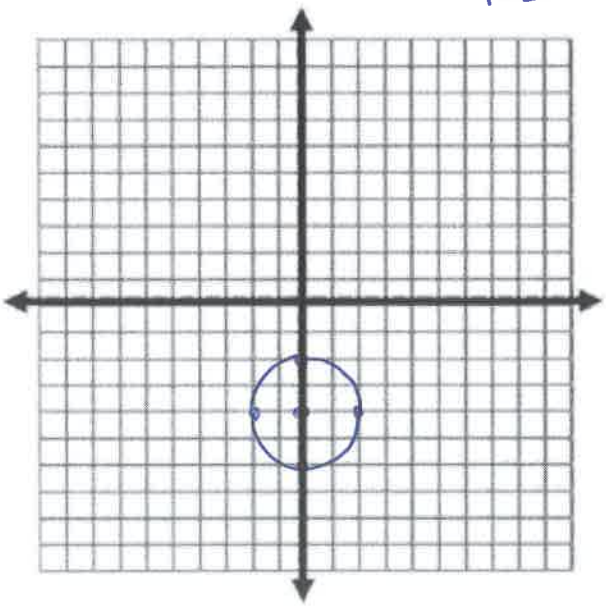
$r=1$



107) $x^2+(y+4)^2=4$

center $(0, -4)$ radius: $r^2=4$

$r=2$



Use the information provided to write the equation of each circle.

108) Center: $(11, -13)$ (h, k)
Radius: 4

$(x-11)^2+(y--13)^2=4^2$

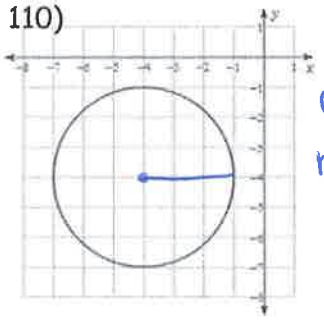
$(x-11)^2+(y+13)^2=16$

109) Center: $(11, 9)$ (h, k)
Radius: 3

$(x-11)^2+(y-9)^2=3^2$

$(x-11)^2+(y-9)^2=9$

110)

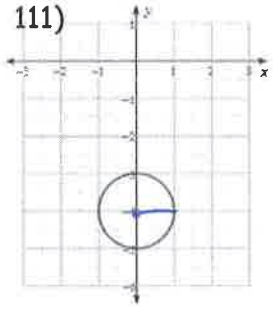


Center: $(-4,-4)$
radius = 3

$(x--4)^2+(y--4)^2=3^2$

$(x+4)^2+(y+4)^2=9$

111)



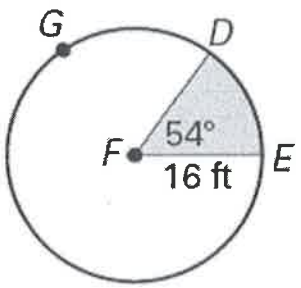
Center $(0,-4)$
radius = 1

$(x-0)^2+(y--4)^2=1^2$

$x^2+(y+4)^2=1$

Find the length of arc DE and find the areas of the sectors formed by ∠DFE. Round answers to the nearest tenth. **(#112-113 Sec 11.4-11.5)**

112)



Arc Length: $\frac{x}{2\pi(16)}=\frac{54}{360}$

$\frac{x}{32\pi}=\frac{54}{360}$

$360x=(54)(32\pi)$

$360x=5425.92$

$x=15.072$

$\overset{\frown}{DE}=15.1$ ft

Sector Area: $\frac{x}{\pi(16)^2}=\frac{54}{360}$

$\frac{x}{256\pi}=\frac{54}{360}$

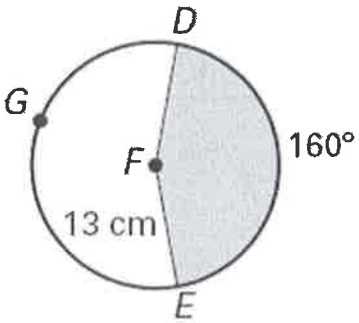
$360x=(54)(256\pi)$

$360x=43407.36$

$x=120.6$

Area $=120.6$ ft^2

113)



Arc Length: $\frac{x}{2\pi(13)}=\frac{160}{360}$

$\frac{x}{26\pi}=\frac{160}{360}$

$360x=(160)(26\pi)$

$360x=13062.4$

$x=36.28$

$\overset{\frown}{DE}=36.3$ cm

Sector Area: $\frac{x}{\pi(13)^2}=\frac{160}{360}$

$\frac{x}{169\pi}=\frac{160}{360}$

$360x=(160)(169\pi)$

$360x=84905.6$

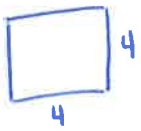
$x=235.8$

Area $=235.8$ cm^2

114) Nicole is buying an aquarium in the shape of a rectangular prism and measures 3.5 feet by 4 feet by 4 feet. What is the volume of the aquarium?

[A] 11.5 ft^3 [B] 28 ft^3 [C] 48 ft^3 [D] 56 ft^3

Base:



$B = (4)(4) = 16$

$h = 3.5$

$V = Bh$

$= (16)(3.5) = 56 \text{ ft}^3$

115) The volume of the pyramid below is _____.

[A] 126 ft^3

[B] 195 ft^3

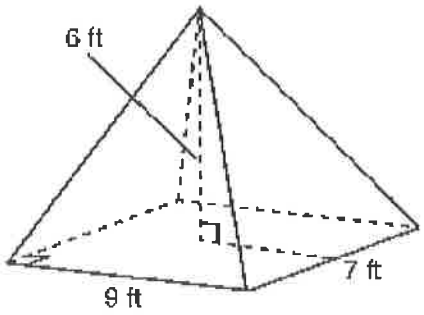
[C] 226 ft^3

[D] 378 ft^3

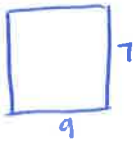
$V = \frac{1}{3}Bh$

$= \frac{1}{3}(63)(6)$

$V = 126 \text{ ft}^3$



Base:



$B = (9)(7) = 63$

$h = 6$

116) A machinist drilled a conical hole into a cube of metal as shown. If the cube has sides of length 8 cm, what is the volume of the metal after the hole is drilled? Use $\pi \approx 3.14$ and round to the nearest tenth.

[A] 378.0 cm^3

[B] 333.4 cm^3

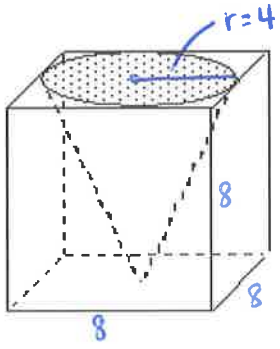
[C] 351.2 cm^3

[D] 393.5 cm^3

Diff: Cube – Cone

$= 512 - 133.97$

$= 378.0 \text{ cm}^3$



Cone: $V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi(4)^2(8)$

$= \frac{1}{3}\pi(16)(8)$

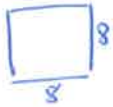
$= 133.97$

Cube: $V = Bh$

$= (64)(8)$

$= 512$

Base:

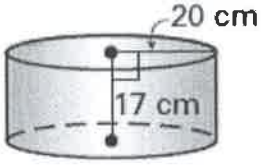


$B = (8)(8) = 64$

$h = 8$

117) Please find the surface area of the figure below. **(Sec 12.2)**

A) 4647.2 cm^2
B) 2960 cm^2
C) 2323.6 cm^2
D) 1480 cm^2



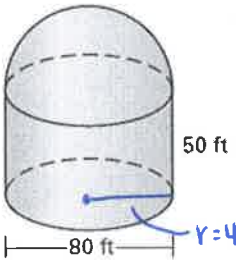
$SA = 2\pi r^2 + 2\pi rh$
$= 2\pi(20)^2 + 2\pi(20)(17)$
$= 2\pi(400) + 2\pi(20)(17)$
$= 2512 + 2135.2$
$= 4647.2\ cm^2$
$r = 12$

118) Please find the surface area of a globe with a 24-inch diameter. **(Sec 12.6)**

A) 1808.64 in^2 B) 7234.56 in^2 C) 904.32 in^2 D) 3627.28 in^2

$SA = 4\pi r^2$
$= 4\pi(12)^2$
$= 4\pi(144)$
$= 1808.64\ in^2$

119) A grain storage tank is called a silo. A silo is the shape of a cylinder covered by a half-sphere as shown. The height of the cylinder is 50 feet and its diameter is 80 ft. Please find the surface area of the silo. **(Sec 12.2/12.6)**



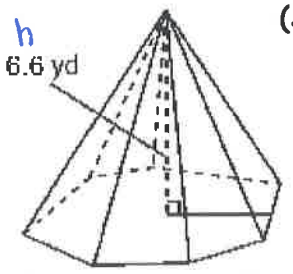
Cylinder: $SA = \pi r^2 + 2\pi rh$
$= \pi(40)^2 + 2\pi(40)(50)$
$= \pi(1600) + 2\pi(40)(50)$
$= 5024 + 12560$
$SA = 17584\ ft^2$

Sphere: $SA = 4\pi r^2$
$= 4\pi(40)^2$
$= 4\pi(1600)$
$SA = 20096$

Total = 20096 + 17584
$= 37680\ ft^2$

120) The base of the pyramid below is a non-regular heptagon with an area of 30.0 square yards. The height of the pyramid is 6.6 yards. Find the volume of the pyramid. **(Sec 12.5)**

$V = Bh$
$= (30)(6.6)$
$V = 198\ yd^3$



Base area – 30 yd^2

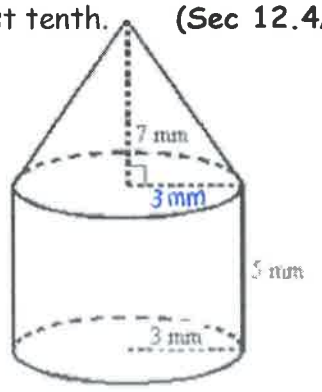
$B = 30$

121) Find the volume of the figure to the nearest tenth. **(Sec 12.4/12.5)**

Cone: $V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}\pi(3)^2(7)$
$= \frac{1}{3}\pi(9)(7)$
$= 65.94$

Cylinder: $V = \pi r^2 h$
$= \pi(3)^2(5)$
$= \pi(9)(5)$
$= 141.3$

Total = 65.94 + 141.3 = $207.2\ mm^3$



122) Find the volume, to the nearest cubic foot, of a sphere whose surface area is 100 ft^2. **(Sec 12.6)**

$SA = 4\pi r^2$

$100 = 4\pi r^2$

$100 = 12.56 r^2$

$7.96 = r^2 \Rightarrow r = 2.82$

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

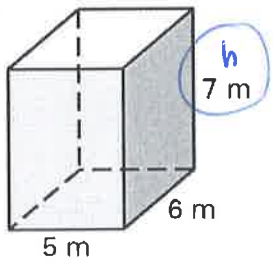
$= \frac{4}{3}\pi (2.82)^3$

$= \frac{4}{3}\pi (22.43)$

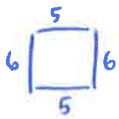
$V = 94\ ft^3$

Find the surface area of the prisms below. **(#123-124 Sec 12.2)**

123)



Base:



$B = (5)(6)$

$B = 30$

$P = 5+6+5+6$

$P = 22$

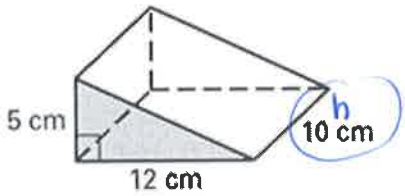
$SA = 2B + Ph$

$= 2(30) + 22(7)$

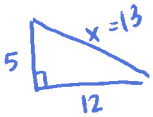
$= 60 + 154$

$SA = 214\ m^2$

124)



Base:



$B = \frac{1}{2}(12)(5)$

$B = 30$

$5^2 + 12^2 = x^2$

$169 = x^2$

$x = 13$

$P = 5+12+13$

$P = 30$

$SA = 2B + Ph$

$= 2(30) + 30(10)$

$= 60 + 300$

$SA = 360\ cm^2$

125) A sphere fits snugly inside a right cylinder as shown below. Find the volume lying outside the sphere but inside the cylinder to the nearest tenth of a cubic inch. **(Sec 12.4/12.6)**

Cylinder: $V = \pi r^2 h$

$= \pi (1)^2 (5)$

$= \pi (5)$

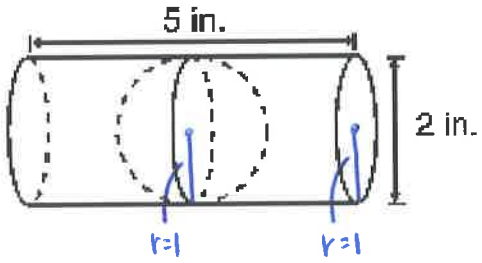
$= 15.7$

Sphere: $V = \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi (1)^3$

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

$= 4.2$



Difference: Cylinder - Sphere

$= 15.7 - 4.2$

$= 11.5\ in^3$