Geometry H

Name: Key

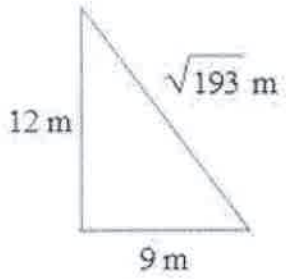
Date: _____ Period: _____

2015-2016 Geometry Review for Final Exam

Unit 5 Right Triangles

For #s 1-4, determine if the triangle is acute, right, or obtuse.

1)

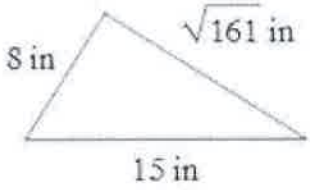


$(\sqrt{193})^2 \_ 12^2+9^2$

$193 < 225$

acute Δ

2)

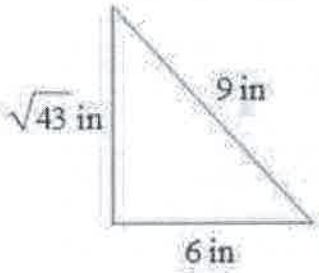


$(15)^2 \_ (\sqrt{161})^2+(8)^2$

$225 = 225$

right Δ

3)

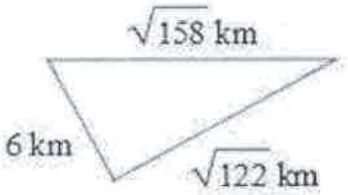


$9^2 \_ (\sqrt{43})^2+6^2$

$81 > 79$

obtuse Δ

4)



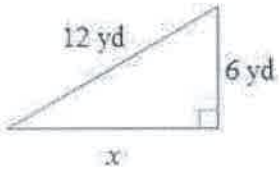
$(\sqrt{158})^2 \_ (\sqrt{122})^2+6^2$

$158 = 158$

right Δ

For #5-14, find the missing side or sides of the triangle. Leave your answer in simplest radical form.

5)



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

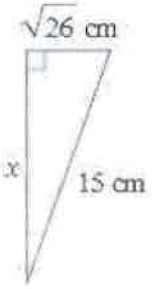
$x^2+36=144$

$x^2=108$

$x=\sqrt{108}$

$x=\sqrt{36}\sqrt{3} \Rightarrow$ $x=6\sqrt{3}$

6)



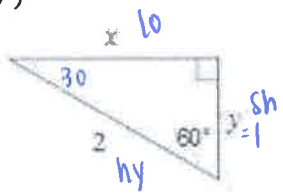
$x^2+(\sqrt{26})^2=15^2$

$x^2+26=225$

$x^2=199$

$x=\sqrt{199}$

7)



hyp = short · 2

2 = y · 2

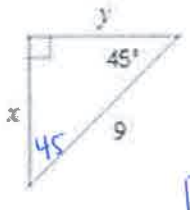
$\boxed{y=1}$

long = short · $\sqrt{3}$

$x = 1\sqrt{3}$

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

8)



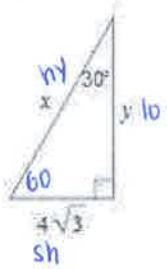
hyp = leg · $\sqrt{2}$

$9 = x\sqrt{2}$

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

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

9)



hyp = short · 2

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

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

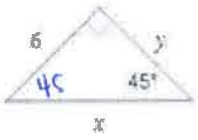
long = short · $\sqrt{3}$

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

$y = 4 \cdot 3$

$\boxed{y=12}$

10)

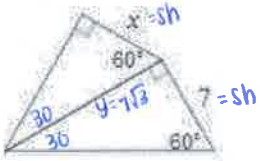


$\boxed{y=6}$

hyp = leg · $\sqrt{2}$

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

11)



long = short · $\sqrt{3}$

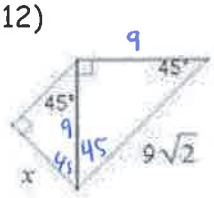
$y = 7\sqrt{3}$

hyp = short · 2

$\frac{7\sqrt{3}}{2} = \frac{x \cdot 2}{2}$

$\boxed{x=\frac{7\sqrt{3}}{2}}$

12)

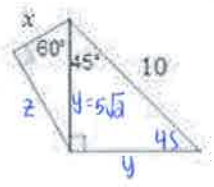


hyp = leg · $\sqrt{2}$

$9 = x\sqrt{2}$

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

13)



hyp = leg · $\sqrt{2}$

$10 = y\sqrt{2}$

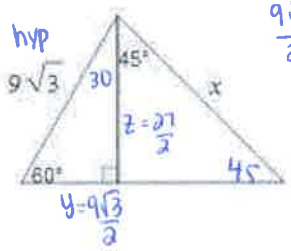
$y = \frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{10\sqrt{2}}{2} = 5\sqrt{2}$

hyp = short · 2

$\frac{5\sqrt{2}}{2} = \frac{x \cdot 2}{2}$

$\boxed{x=\frac{5\sqrt{2}}{2}}$

14)



hyp = short · 2

$\frac{9\sqrt{3}}{2} = \frac{y \cdot 2}{2}$

$y = \frac{9\sqrt{3}}{2}$

long = short · $\sqrt{3}$

$z = \frac{9\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{1}$

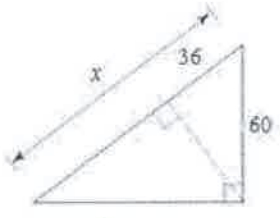
$= \frac{9 \cdot 3}{2} = \frac{27}{2}$

hyp = leg · $\sqrt{2}$

$\boxed{x=\frac{27\sqrt{2}}{2}}$

Find the missing sides.

15)



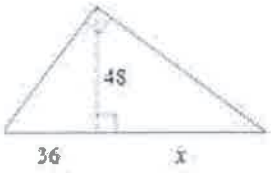
"slingshot/pinball"

$\frac{36}{60} = \frac{60}{x}$

$36x = 3600$

$x = 100$

16)



"upside down T"

$\frac{36}{48} = \frac{48}{x}$

$36x = 2304$

$x = 64$

Find the indicated angle to the nearest degree.

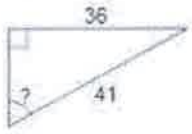
17)

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

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

$\theta = 19.5°$

18)



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

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

$\theta = 61.4°$

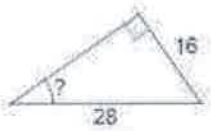
19)

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

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

$\theta = 47.0°$

20)



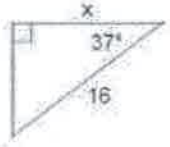
$\sin\theta = \frac{16}{28}$

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

$\theta = 34.8°$

Find the missing side. Round to the nearest tenth.

21)

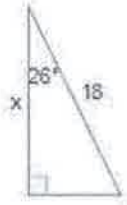


$\frac{\cos 37}{1} = \frac{x}{16}$

$x = 16\cos 37$

$x = 12.8$

22)



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

$x = 18\cos 26$

$x = 16.2$

23)

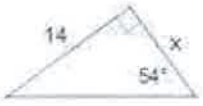
$\frac{\sin 17}{1} = \frac{17}{x}$

$17 = x\sin 17$

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

$x = 58.1$

24)



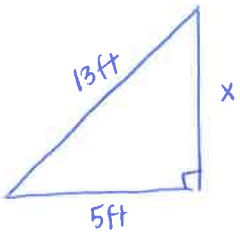
$\frac{\tan 54}{1} = \frac{14}{x}$

$14 = x\tan 54$

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

$x = 10.2$

25) **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?



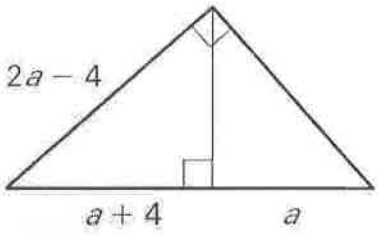
$x^2+5^2=13^2$

$x^2+25=169$

$x^2=144$

$\boxed{x=12 \text{ ft}}$

26) Solve for a.



$\frac{a+4}{2a-4}=\frac{2a-4}{2a+4}$

$(2a-4)(2a-4)=(a+4)(2a+4)$

$4a^2-8a-8a+16=2a^2+4a+8a+16$

$4a^2-16a+16=2a^2+12a+16$

$2a^2-28a=0$

$2a(a-14)=0$

$2a=0 \quad a-14=0$

$a\neq 0 \quad \boxed{a=14}$

no zero side lengths

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

27) $7, 9, \sqrt{130}$

$7+9>11.4$ ✓

$7+11.4>9$ ✓

$9+11.4>7$ ✓

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

$130=130$

$\boxed{\text{right } \Delta}$

28) $5, 13, 20$

$5+13>20$ ← NO

$\boxed{\text{not a } \Delta}$

29) $13, 19, 29$

$13+19>29$ ✓

$13+29>19$ ✓

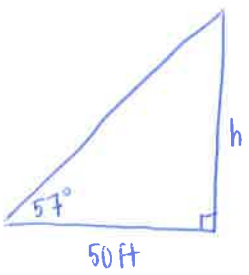
$19+29>13$ ✓

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

$841>530$

$\boxed{\text{obtuse } \Delta}$

30) **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.



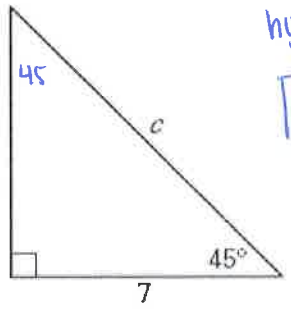
$\frac{\tan 57}{1}=\frac{h}{50}$

$h=50\tan 57°$

$\boxed{h=77 \text{ ft}}$

Find the value of each variable. Write your answers in simplest radical form.

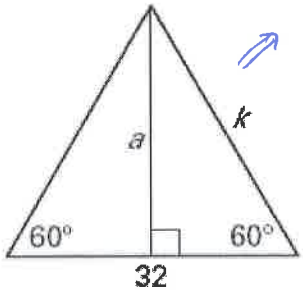
31)

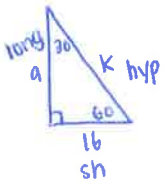


hyp = leg · √2

c = 7√2

32)





hyp = short · 2

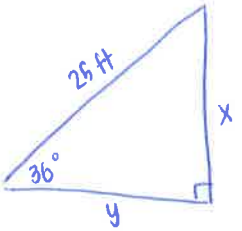
K = 16 · 2

K = 32

long = short · √3

a = 16√3

33) 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.



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

$x = 25 \sin 36$

$x = 14.69$

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

$y = 25 \cos 36$

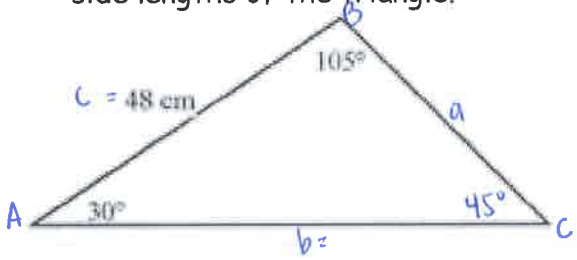
$y = 20.23$

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

$= \frac{1}{2}(14.69)(20.23)$

$A = 148.59 \text{ ft}^2$

34) Use the Law of Sines to find the missing side lengths of the triangle.



$\frac{\sin 30}{a} = \frac{\sin 105}{b} = \frac{\sin 45}{48}$

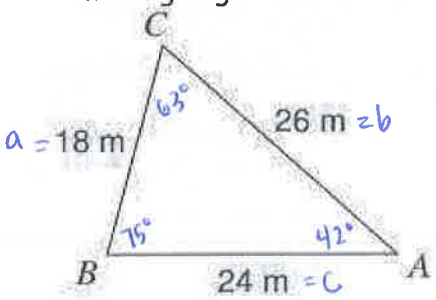
$48 \sin 30 = a \sin 45$

$a = 33.9$

$48 \sin 105 = b \sin 45$

$b = 65.6$

35) Use the Law of Cosines to find the missing angle measures.



$b^2 = a^2 + c^2 - 2ac \cos B$

$26^2 = 18^2 + 24^2 - 2(18)(24) \cos B$

$676 = 900 - 864 \cos B$

$-224 = -864 \cos B$

$0.2593 = \cos B$

$m\angle B = 75°$

$\frac{\sin A}{18} = \frac{\sin 75}{26}$

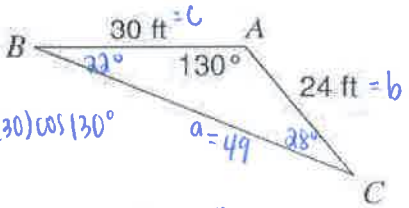
$18 \sin 75 = 26 \sin A$

$0.6687 = \sin A$

$m\angle A = 42°$

$m\angle C = 63°$

36) Solve the triangle.



$a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = 24^2 + 30^2 - 2(24)(30) \cos 130°$

$a^2 = 2401.61$

$a = 49$

$\frac{\sin 130}{49} = \frac{\sin B}{24}$

$24 \sin 130 = 49 \sin B$

$.3782 = \sin B$

$m\angle B = 22°$

$m\angle C = 28°$

Unit 5.5 Transformations

37) 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

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

(1) y axis: $(x,y) \rightarrow (-x,y)$

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

$A'(-1,3)$

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

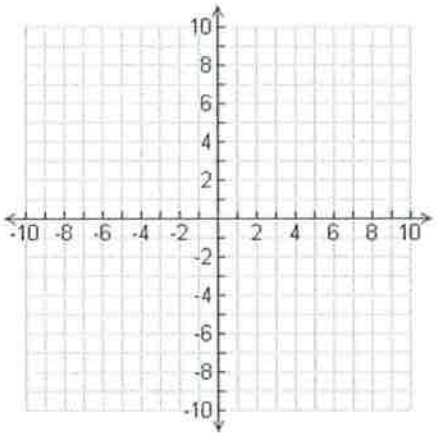
$(-1,3) \rightarrow (-1-4, 3+2)$

$\boxed{A''(-5,5)}$

38) 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°?

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"?



(a) Rotate 180°: $(x,y) \rightarrow (-x,-y)$

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

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

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

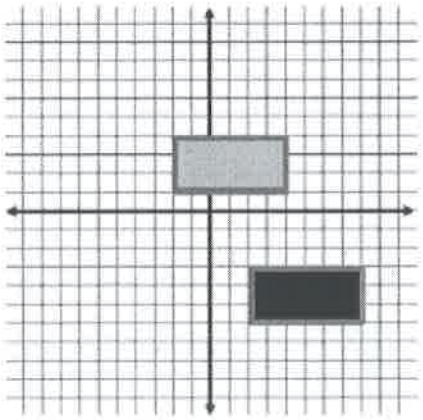
(b) $(x,y) \rightarrow (x-3, y-4)$

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

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

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

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



Dark → Light: Left 4 units, up 7 units

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

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

Rotate 90° CCW: $(x,y) \rightarrow (-y, x)$

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

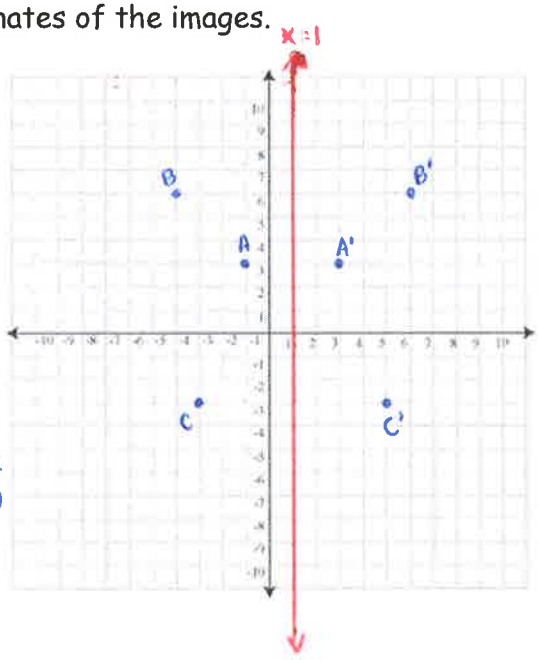
41) Identify the coordinates of (10, -20) after a 270° counter-clockwise rotation about the origin.

270° Rotation CCW: $(x, y) \to (y, -x)$

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

42) Graph ΔABC after a composition of the transformations in the order they are listed. You may use the grid below to help you find the coordinates of the images.

A(-1, 3), B(-4, 6), C(-3, -3)



a) Reflection in the line x = 1

A' (3,3) B' (6,6) C' (5,-3)

b) Rotation 270 counterclockwise about the point (-2, 0)

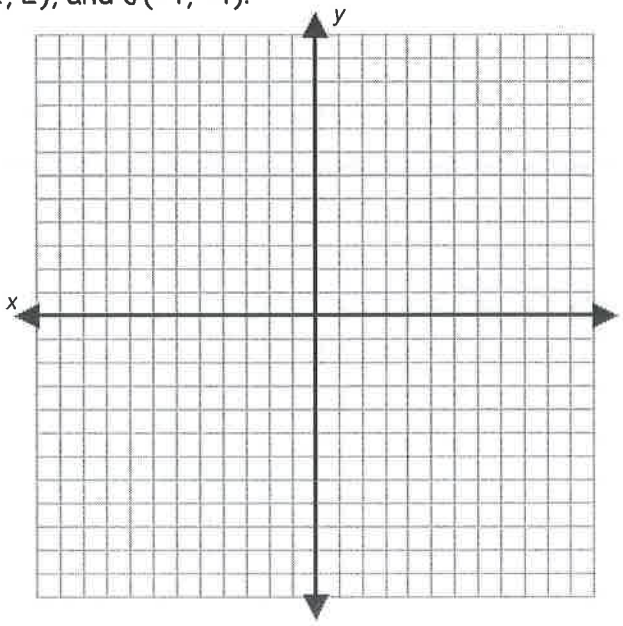
$(x, y) \to (y, -x)$

A'' (1,-5) B'' (4,-8) C'' (-5,-7)

x+2 to get back to (0,0)

43) Find the coordinates of the dilation image of ΔGHJ centered at the point (2, 4) with a scale factor of $\frac{1}{2}$ given coordinates G(-8, 2), H(-2, 2), and J(-4, -4).

You can skip this one; its a dilation and we did those before midterms ☺



Work for #42b.

$A'(3,3) \xrightarrow{x+2} (5,3) \xrightarrow{270^\circ} (3,-5) \xrightarrow{x-2} A''(1,-5)$

$B'(6,6) \xrightarrow{x+2} (8,6) \xrightarrow{270^\circ} (6,-8) \xrightarrow{x-2} B''(4,-8)$

$C'(5,-3) \xrightarrow{x+2} (7,-3) \xrightarrow{270^\circ} (-3,-7) \xrightarrow{x-2} C''(-5,-7)$

Unit 6 Polygons

$(n-2)\cdot 180$

Find the sum of the measures of the interior angles of the indicated convex polygon.

37) 13-gon

$(13-2)\cdot 180$

$= \boxed{1980^\circ}$

38) Octagon

$(8-2)\cdot 180$

$= \boxed{1080^\circ}$

39) 22-gon

$(22-2)\cdot 180$

$= \boxed{3600^\circ}$

40) Pentagon

$(5-2)\cdot 180$

$= \boxed{540^\circ}$

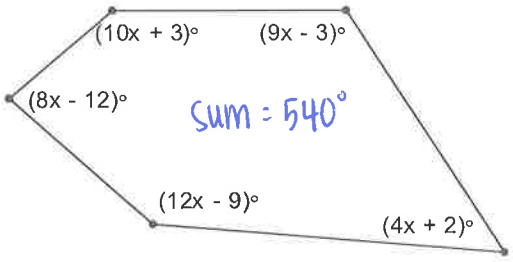
41) In the figure at the right,

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

$43x - 19 = 540$

$43x = 559$

$\boxed{x = 13}$



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

$\boxed{360^\circ}$

$\frac{360}{n}$

Find the measure of each exterior angle in the following regular polygon.

42) Quadrilateral

$\frac{360}{4} = \boxed{90^\circ}$

43) Octagon

$\frac{360}{8} = \boxed{45^\circ}$

Find the value of n for each regular n-gon described. $\frac{(n-2)\cdot 180}{n}$

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

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

$165n = 180n - 360$ → $-15n = -360$

$\boxed{n = 24}$

45) Each exterior angle of the regular n-gon has a measure of 60°. $\frac{360}{n}$

$\frac{60}{1} = \frac{360}{n}$

$360 = 60n \Rightarrow \boxed{n = 6}$

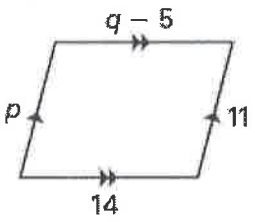
46) The sum of the interior angles of the regular n-gon is 2700°. $(n-2)\cdot 180$

$\frac{2700}{180} = \frac{(n-2)\cdot 180}{180}$

$15 = n - 2 \Rightarrow \boxed{n = 17}$

Find the values of each variable in the parallelogram.

47)

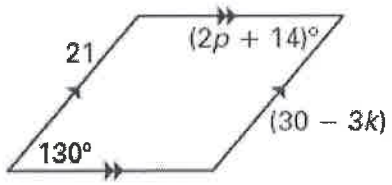


$\boxed{p = 11}$

$q - 5 = 14$

$\boxed{q = 19}$

48)



$2p + 14 = 130$

$2p = 116$

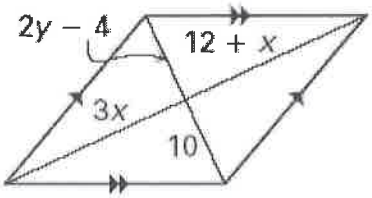
$\boxed{p = 58}$

$21 = 30 - 3k$

$-9 = -3k$

$\boxed{k = 3}$

49)



$3x = 12 + x$

$2x = 12$

$\boxed{x = 6}$

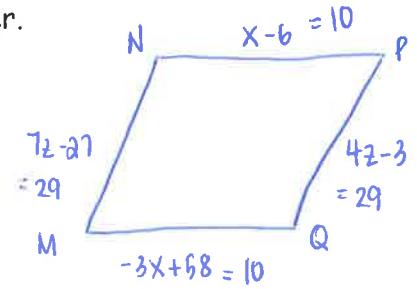
$2y - 4 = 10$

$2y = 14$

$\boxed{y = 7}$

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

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



$x-6 = -3x+58$

$4x = 64$

$\boxed{x = 16}$

$7z-27 = 4z-3$

$3z = 24$

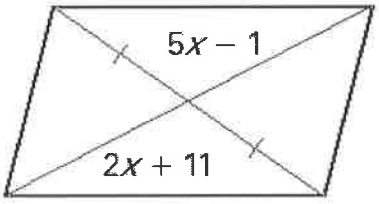
$\boxed{z = 8}$

$P = 10+10+29+29$

$\boxed{P = 78 \text{ units}}$

For what value of x is the quadrilateral a parallelogram?

51)

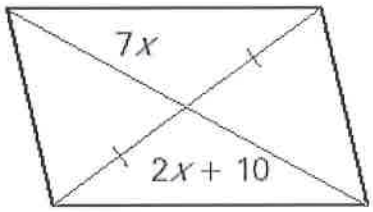


$5x-1 = 2x+11$

$3x = 12$

$\boxed{x = 4}$

52)

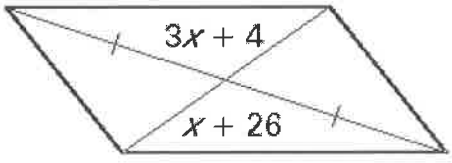


$7x = 2x+10$

$5x = 10$

$\boxed{x = 2}$

53)



$3x+4 = x+26$

$2x = 22$

$\boxed{x = 11}$

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

54) $m\angle ABE$ = 40°

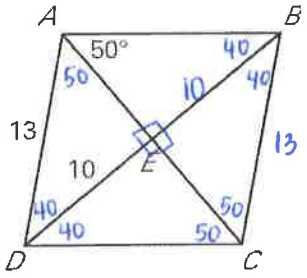
55) $m\angle DEC$ = 90°

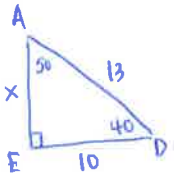
56) DB = 10+10 = 20

57) AE = $\sqrt{69}$ = 8.3

58) $m\angle DAC$ = 50°

59) BC = 13





$x^2 + 10^2 = 13^2$

$x^2 + 100 = 169$

$x^2 = 69$

$x = \sqrt{69}$

60) Use the diagram of the parallelogram MNOP at the right to complete each statement. Explain.

a) $\overline{MN} \cong$ $\overline{OP}$

b) $\overline{ON} \cong$ $\overline{MP}$

c) $\overline{PQ} \cong$ $\overline{NQ}$

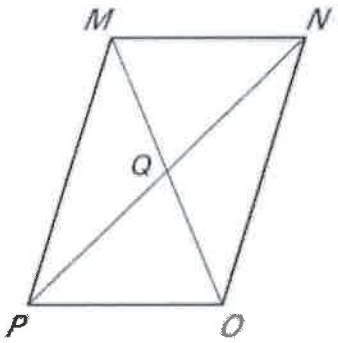
d) $\angle MQN \cong$ $\angle OQP$

e) $\overline{MN} \parallel$ $\overline{OP}$

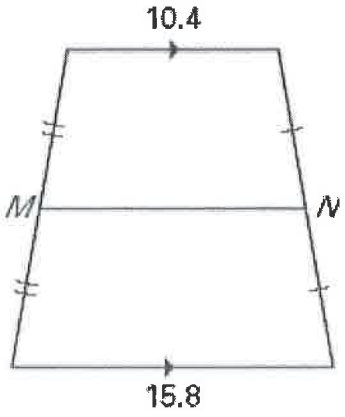
f) $\angle MQN \cong$ $\angle OQP$

g) $\overline{MQ} \cong$ $\overline{OQ}$

h) $\angle NPO \cong$ $\angle PNM$



61) Find the length of the midsegment of the trapezoid.



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

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

$MN = 13.1$

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.

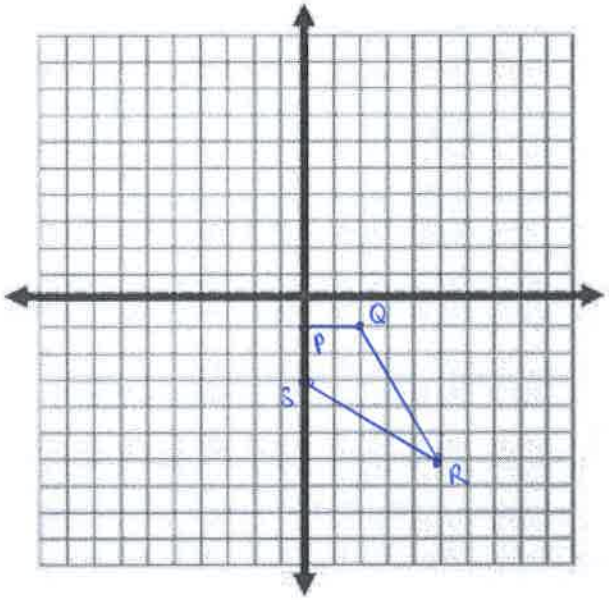
62) $P(0,-1), Q(2,-l), R(5,-6), S(0,-3)$

$PS = \sqrt{(0-0)^2+(-1+3)^2} = \sqrt{(2)^2} = \sqrt{4} = 2$

$PQ = \sqrt{(2-0)^2+(-1+1)^2} = \sqrt{(2)^2} = \sqrt{4} = 2$

$QR = \sqrt{(5-2)^2+(-6+1)^2} = \sqrt{(3)^2+(-5)^2} = \sqrt{9+25} = \sqrt{34}$

$SR = \sqrt{(5-0)^2+(-6+3)^2} = \sqrt{(5)^2+(-3)^2} = \sqrt{25+9} = \sqrt{34}$



Since two pairs of consecutive sides are congruent ($\overline{PS} \cong \overline{PQ}$ and $\overline{QR} \cong \overline{SR}$), then quad PQRS is a kite

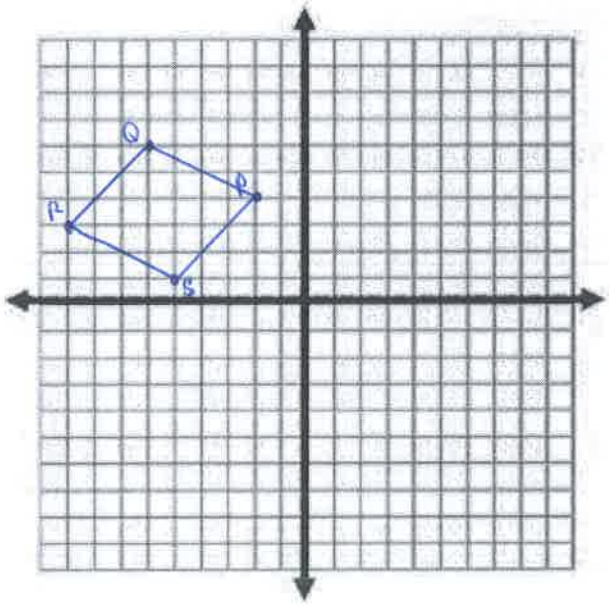
63) $P(-2,4), Q(-6,6), R(-9,3), S(-5,1)$

$QR = \sqrt{(-6+9)^2+(6-3)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

$PS = \sqrt{(-2+5)^2+(4-1)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

$QP = \sqrt{(-2+6)^2+(4-6)^2} = \sqrt{(4)^2+(-2)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$

$RS = \sqrt{(-5+9)^2+(1-3)^2} = \sqrt{(4)^2+(-2)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$



Since both pairs of opposite sides are congruent, ($\overline{QR} \cong \overline{PS}$ and $\overline{QP} \cong \overline{RS}$), quad PQRS is a parallelogram.

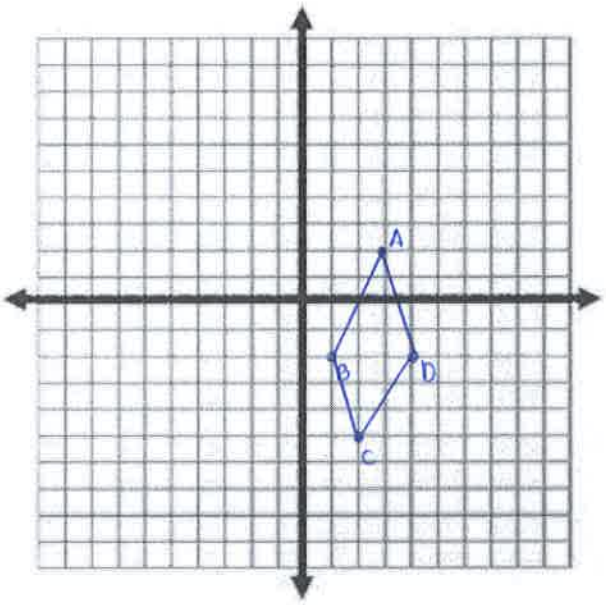
64)Graph the points $A(3,2), B(1,-2), C(2,-5), D(4,-1)$ on the coordinate plane. What kind of quadrilateral is ABCD? Use mathematics to justify your answer.

$AB = \sqrt{(3-1)^2+(2+2)^2} = \sqrt{(2)^2+(4)^2} = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$

$CD = \sqrt{(4-2)^2+(-1+5)^2} = \sqrt{(2)^2+(4)^2} = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$

$AD = \sqrt{(4-3)^2+(-1-2)^2} = \sqrt{(1)^2+(-3)^2} = \sqrt{1+9} = \sqrt{10}$

$BC = \sqrt{(2-1)^2+(-5+2)^2} = \sqrt{(1)^2+(-3)^2} = \sqrt{1+9} = \sqrt{10}$

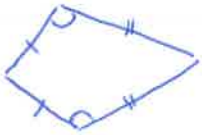


Since both pairs of opposite sides are congruent, ($\overline{AB} \cong \overline{DC}$ and $\overline{AD} \cong \overline{BC}$), quadrilateral ABCD is a parallelogram

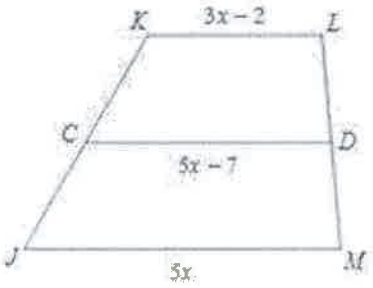
Sketch a quadrilateral having the characteristics described. Mark any required congruencies.

65)A rhombus that is not a square.

66)A kite



67)Find the length of the midsegment of the trapezoid.



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

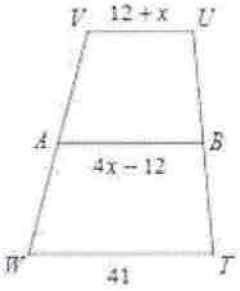
$5x-7 = \frac{1}{2}(8x-2)$

$5x-7 = 4x-1$

$\boxed{x=6}$

$mid = 5(6)-7 = \boxed{23}$

68)Find UV



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

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

$8x-24 = x+53$

$7x = 77$

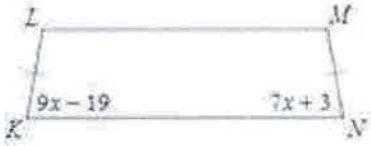
$x = 11$

$UV = 12+11$

$UV = 23$

Find the measurement of the angle indicated for each trapezoid.

69)Find $m\angle L$



$9x-19 = 7x+3$

$2x = 22$

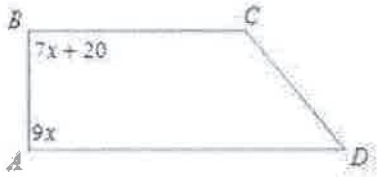
$x = 11$

$m\angle K = 99-19 = 80$

$m\angle L = 180-80$

$m\angle L = 100°$

70) Find $m\angle A$



$9x+7x+20 = 180$

$16x+20 = 180$

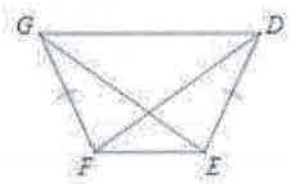
$16x = 160$

$x = 10$

$m\angle A = 9(10)$

$m\angle A = 90°$

71) Find the length of EG if $EG = 4x - 31$ and $DF = 3x - 19$.



$4x-31 = 3x-19$

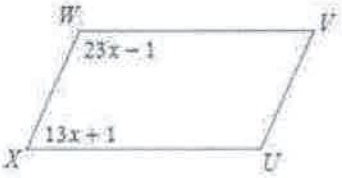
$x = 12$

$EG = 4(12)-31$

$EG = 17$

Find the measurement indicated in each parallelogram.

72) Find $m\angle W$



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

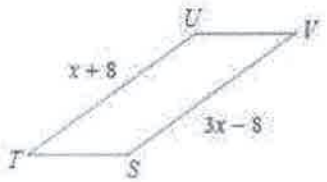
$36x = 180$

$x = 5$

$m\angle W = 23(5)-1$

$m\angle W = 114°$

73) Find TU



$x+8 = 3x-8$

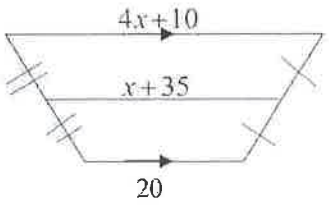
$16 = 2x$

$x = 8$

$TU = 8+8$

$TU = 16$

74)Find the value of x in the figure



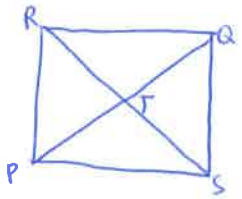
$x+35 = \frac{1}{2}(4x+10+20)$

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

$x+35 = 2x+15$

$20 = x$

75)Quadrilateral PQRS has diagonals $\overline{PQ}$ and $\overline{RS}$ that intersect at point T. For the conditions given below, state the quadrilateral which they best describe. If none, write "none".



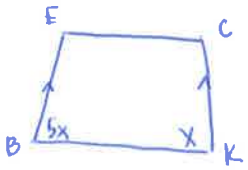
a. $\overline{PS} \parallel \overline{QR}, \overline{PS} \cong \overline{QR}$ Isosceles Trapezoid

b. PQRS is a parallelogram, $\overline{PR} \perp \overline{QS}$ Rhombus

c. PQRS is a parallelogram, $\overline{PR} \cong \overline{QS}\ \overline{PR} \cong \overline{QS}$, Rectangle

d. $\overline{QP} \parallel \overline{RS}$
none

76)In trapezoid BECK, the $m\angle B$ is 5 times the m∠K and $\overline{BE} \parallel \overline{CK}$. Find the $m\angle K$.

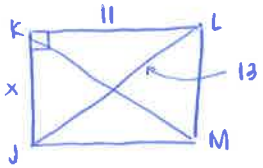


$6x = 180$

$x = 30$

$m\angle K = 30°$

77)If rectangle $JKLM$ has $MK = 3x - 5$, $JL = 2y + 5$, $KL = x + 5$, and $JM = 4y - 5$. Find JK and KL.



$MK = JL$

$3x - 5 = 2y + 5$

$3x = 2y + 10$

$2y = 3x - 10$

$4y = 6x - 20$

$KL = JM$

$x + 5 = 4y - 5$

$4y = x + 10$

$x + 10 = 6x - 20$

$10 = 5x - 20$

$5x = 30$

$x = 6$

$y = 4$

$x^2 + 11^2 = 13^2$

$x^2 = 48$

$x = 4\sqrt{3}$

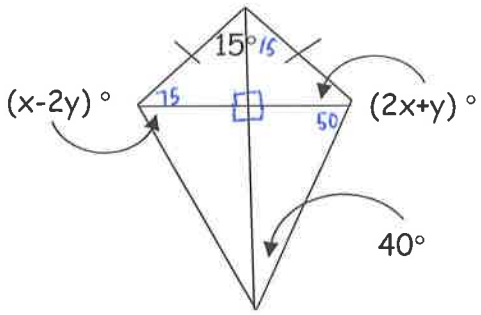
$JK = 4\sqrt{3}$

$KL = 6 + 5 = 11$

78)If the figure is a kite, find the values of x and y

$x =$ 40

$y =$ -5



$2x + y = 75$

$-2[x - 2y = 50] \Rightarrow$

$2x + y = 75$

$-2x + 4y = -100$

$5y = -25$

$y = -5$

$2x - 5 = 75$

$2x = 80$

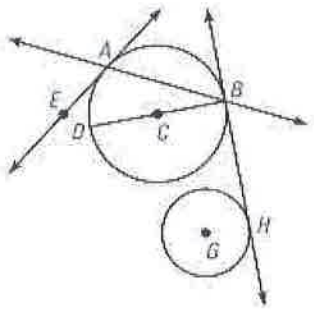
$x = 40$

79)In quadrilateral LMNO, if $m\angle L \cong m\angle N$, how could LMNO not be classified?

a) parallelogram b) kite c) trapezoid (d) rhombus e) None of the above

Unit 7 Circles

80)Identify each in the diagram.



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

b. Center C, G

c. Tangent, $\overleftrightarrow{EA}$, $\overleftrightarrow{BH}$

d. Chord $\overline{AB}$, $\overline{DB}$

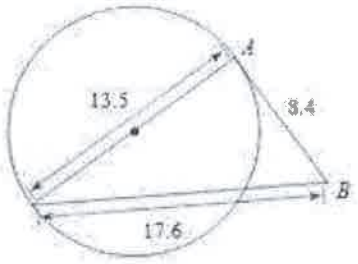
e. Common Tangent $\overleftrightarrow{BH}$

f. Diameter $\overline{DB}$

g. Secant $\overleftrightarrow{AB}$

Determine if line AB is tangent to the circle.

81)

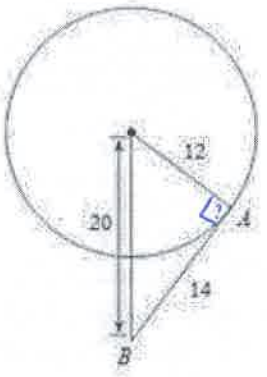


$13.5^2+8.4^2 \_ 17.6^2$

$252.81 < 309.76$

no, not tangent

82)



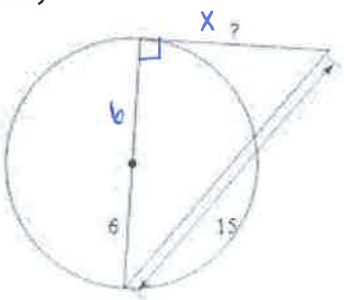
$12^2+14^2 \_ 20^2$

$340 < 400$

no, not tangent

Find the segment length indicated. Assume that lines which appear tangent are tangent.

83)



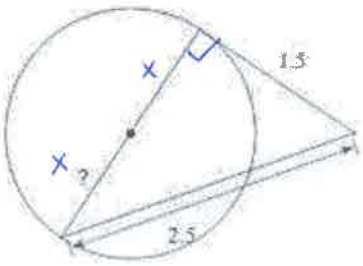
$X^2+12^2=15^2$

$X^2+144=225$

$X^2=81$

$X=9$

84)



$1.5^2+(2X)^2=2.5^2$

$4X^2+2.25=6.25$

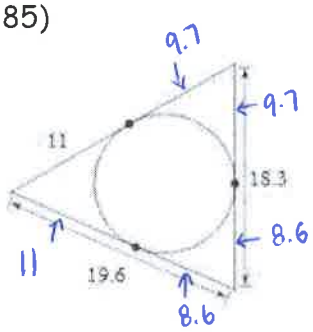
$4X^2=4$

$X^2=1$

$X=1$

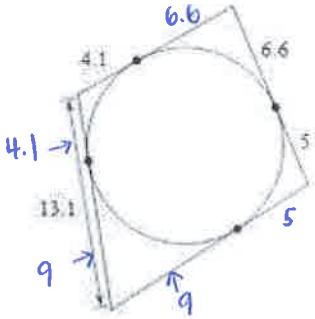
Find the perimeter of each polygon. Assume that lines which appear tangent are tangent.

85)



$P = 58.6$ units

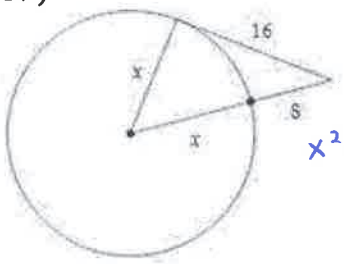
86)



$P = 49.4$ units

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

87)



FOIL

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

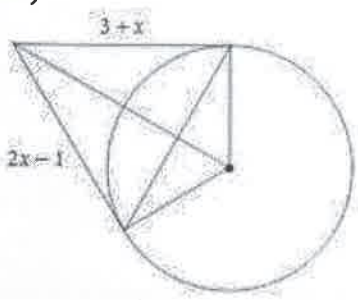
$x^2 + 256 = x^2 + 16x + 64$

$256 = 16x + 64$

$192 = 16x$

$x = 12$

88)



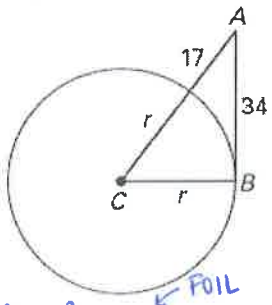
$3 + x = 2x - 1$

$3 = x - 1$

$x = 4$

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

89)



FOIL

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

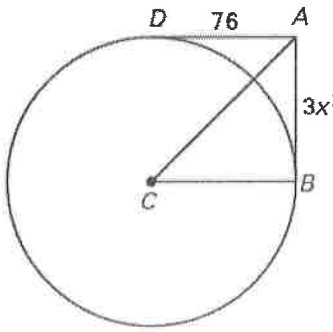
$r^2 + 1156 = r^2 + 34r + 289$

$1156 = 34r + 289$

$867 = 34r$

$r = 25.5$

90)



$76 = 3x^2 + 1$

$0 = 3x^2 - 75$

$0 = 3(x^2 - 25)$

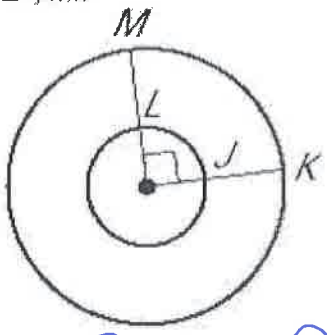
$0 = x^2 - 25$

$25 = x^2$

$x = \pm 5$

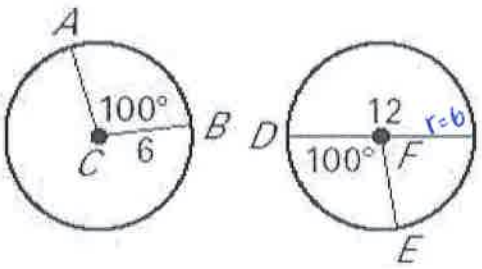
Determine whether the given arcs are congruent. *Explain* why or why not.

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



no, even though $m\overset{\frown}{LJ} = 90°$ and $m\overset{\frown}{MK} = 90°$, they are not in congruent circles

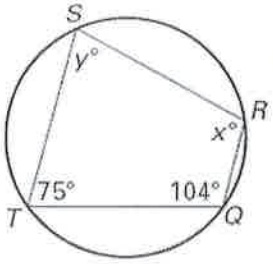
92) $\overset{\frown}{AB}$, $\overset{\frown}{DE}$



yes, $m\overset{\frown}{AB} = 100°$ and $m\overset{\frown}{DE} = 100°$. They both are in circles with a radius of 6 units.

Find the value of the variables.

93)



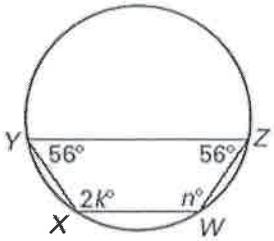
$x + 76 = 180$

$\boxed{x = 104}$

$y + 104 = 180$

$\boxed{y = 76}$

94)



$2K + 56 = 180$

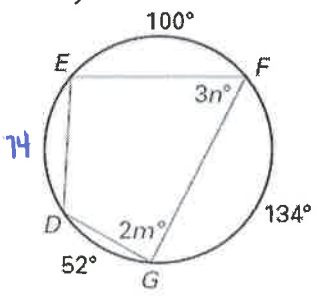
$2K = 124$

$\boxed{K = 62}$

$n + 56 = 180$

$\boxed{n = 124}$

95)



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

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

$2m = 87$

$\boxed{m = 43.5}$

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

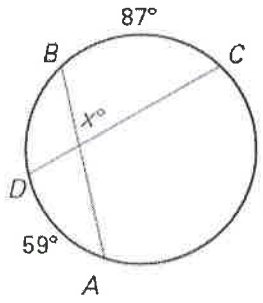
$3n = \frac{1}{2}(126)$

$3n = 63$

$\boxed{n = 21}$

Find the value of x.

96)

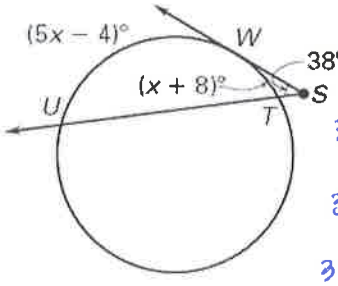


$x = \frac{1}{2}(87+59)$

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

$\boxed{x = 73}$

97)



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

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

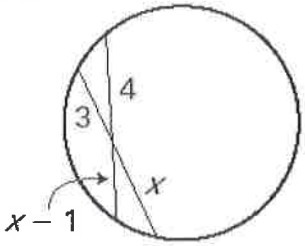
$38 = \frac{1}{2}(4x-12)$

$38 = 2x-6$

$44 = 2x$

$\boxed{x = 22}$

98)



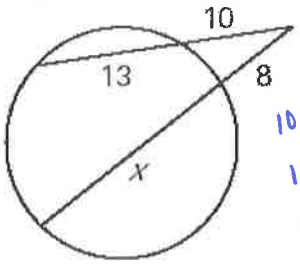
$4(x-1) = 3x$

$4x-4 = 3x$

$-4 = -x$

$\boxed{x = 4}$

99)



$10(10+13) = 8(x+6)$

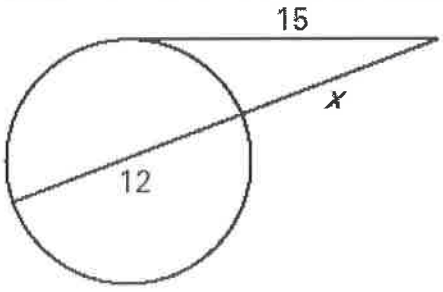
$10(23) = 8x+64$

$230 = 8x+64$

$166 = 8x$

$\boxed{x = 20.75}$

100)



$15^2 = x(x+12)$

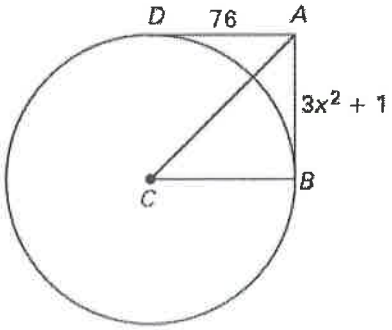
$225 = x^2+12x$

$x^2+12x-225 = 0$

$\frac{-12 \pm \sqrt{1044}}{2} \approx \begin{matrix} 10.16 \\ -22.16 \end{matrix}$

$\boxed{x = 10.16}$

101)



$76 = 3x^2+1$

$0 = 3x^2-75$

$0 = 3(x^2-25)$

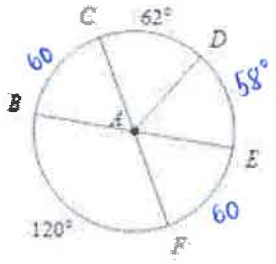
$0 = x^2-25$

$25 = x^2$

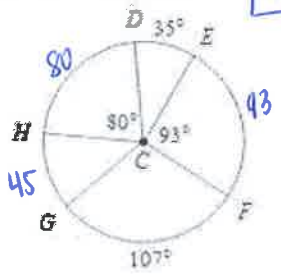
$\boxed{x = \pm 5}$

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

102) $m\angle DAF$



103) $m\angle GCH$ = 45°

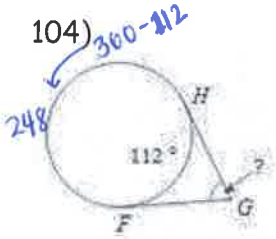


$m\angle DAF = 58 + 60$

$m\angle DAF = 118°$

Find the measure of the arc or angle indicated. Assume that lines which appear to be tangent are tangent.

104)

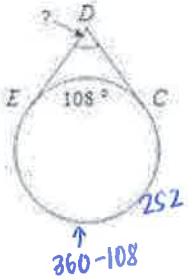


$X = \frac{1}{2}(248 - 112)$

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

$X = 68$

105)

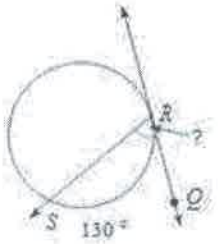


$X = \frac{1}{2}(252 - 108)$

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

$X = 72$

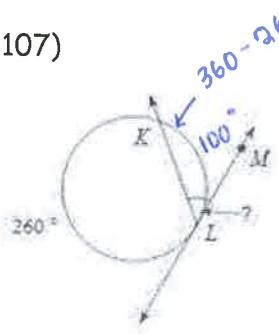
106)



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

$X = 66$

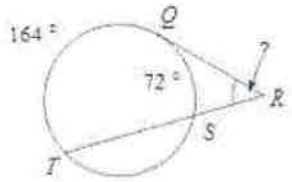
107)



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

$X = 50$

108)

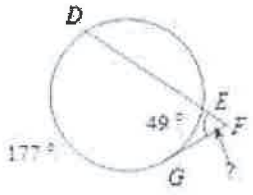


$X = \frac{1}{2}(164-72)$

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

$\boxed{X = 46^\circ}$

109)

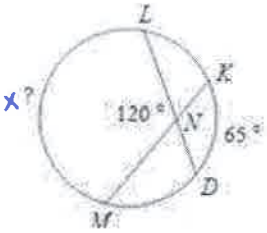


$X = \frac{1}{2}(177-49)$

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

$\boxed{X = 64}$

110)

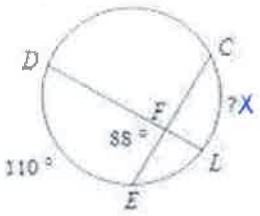


$120 = \frac{1}{2}(X+65)$

$240 = X+65$

$\boxed{X = 175}$

111)

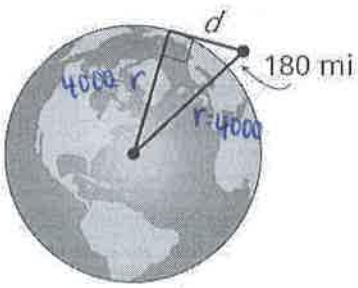


$88 = \frac{1}{2}(110+X)$

$176 = 110+X$

$\boxed{X = 66}$

112) 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.



$4000^2 + d^2 = (180+4000)^2$

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

$d^2 = 1472400$

$\boxed{d \approx 1213.4 \text{ mi}}$

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

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

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

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

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

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

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

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

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

115) $x^2 + y^2 + 20x + 28y + 277 = 0$

$x^2 + 20x + \underline{100} + y^2 + 28y + \underline{196} = -277 + 100 + 196$

$\frac{1}{2}(20) = 10$, $(10)^2 = 100$

$\frac{1}{2}(28) = 14$, $(14)^2 = 196$

$(x+10)^2 + (y+14)^2 = 19$

center: $(-10, -14)$ radius $= \sqrt{19} \approx 4.3$

116) $x^2 + y^2 + 10x + 2y - 123 = 0$

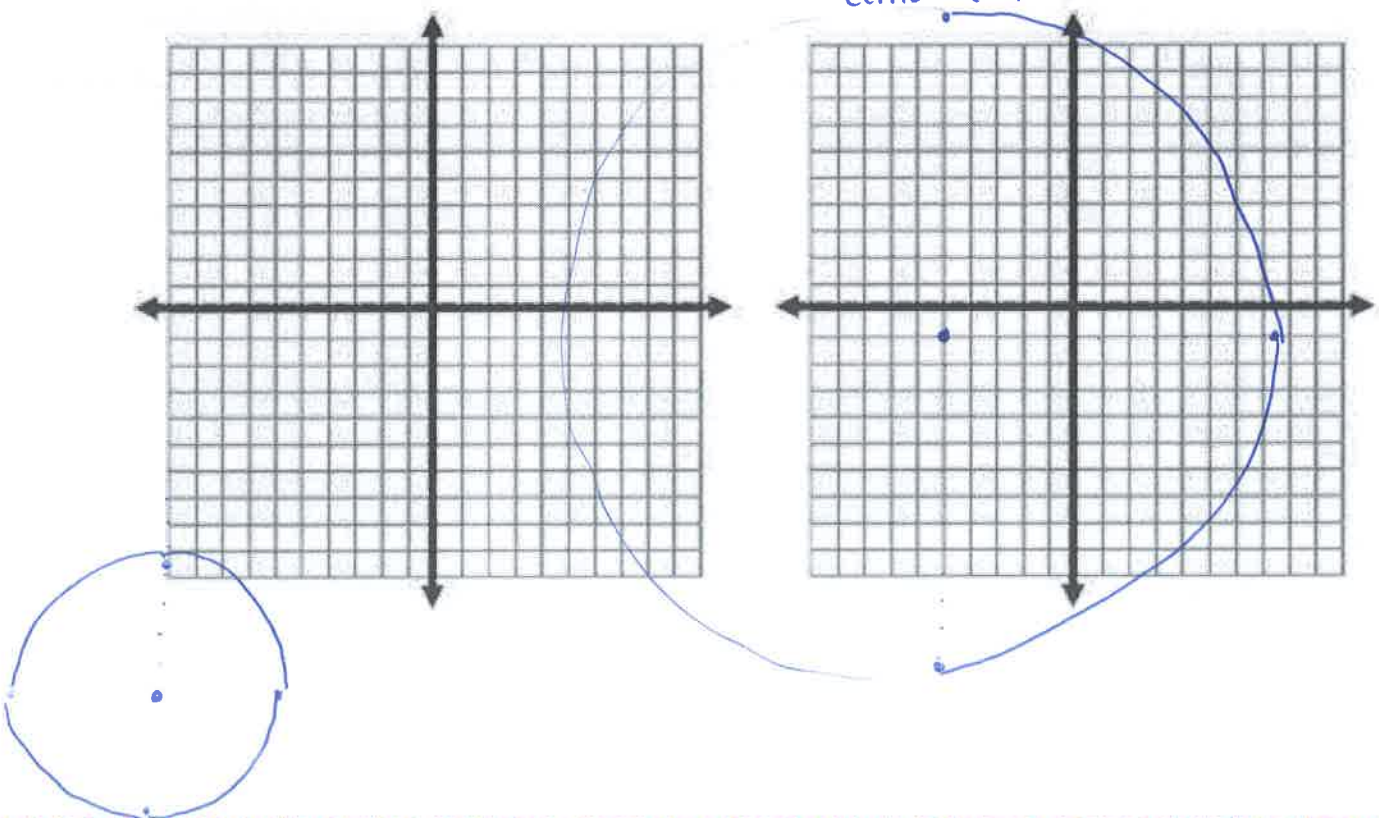
$x^2 + 10x + \underline{25} + y^2 + 2y + \underline{1} = 123 + 25 + 1$

$\frac{1}{2}(10) = 5$, $(5)^2 = 25$

$\frac{1}{2}(2) = 1$, $(1)^2 = 1$

$(x+5)^2 + (y+1)^2 = 149$

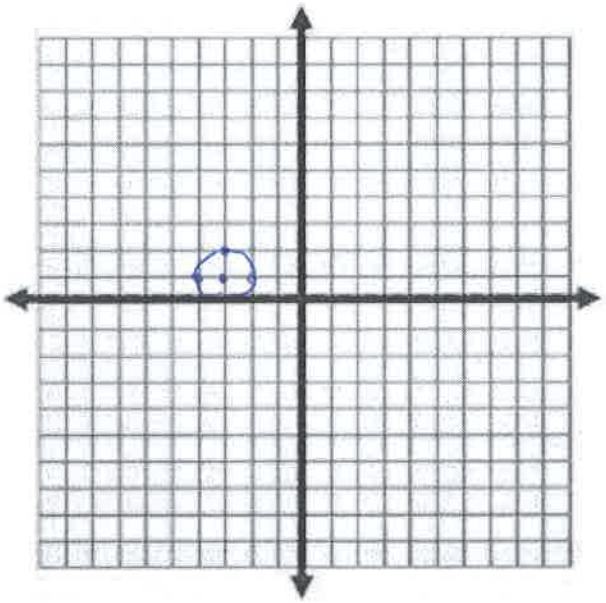
center: $(-5, -1)$ radius $= \sqrt{149} \approx 12.2$



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

$C(-3,1)$

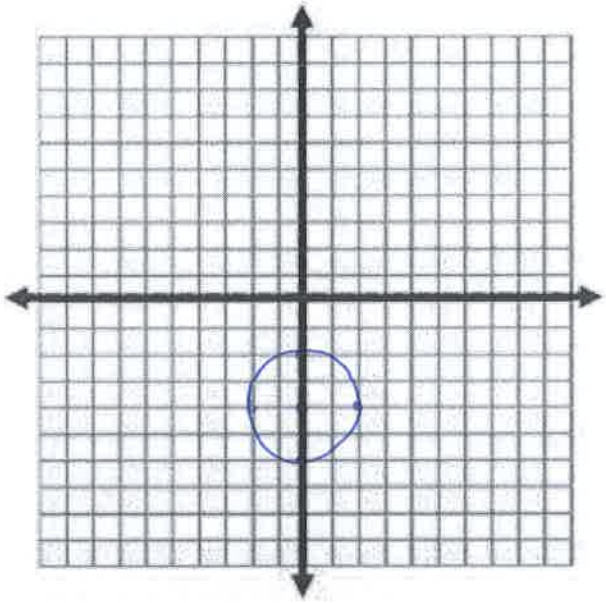
$r=1$



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

$C(0,-4)$

$r=2$



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

119) Center: $(11,-13)$
Radius: 4

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

120) Center: $(11,9)$
Radius: 3

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

121) Center: $(-2,6)$
Point on Circle: $(-11,7)$

$(x+2)^2+(y-6)^2=82$

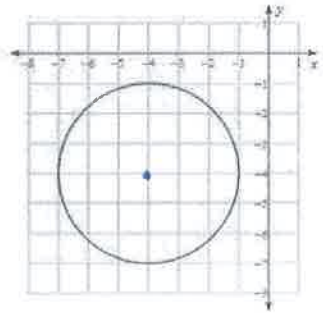
$r=\sqrt{(-11+2)^2+(7-6)^2}=\sqrt{81+1}=\sqrt{82}$

122) Center: $(-8,-5)$
Point on Circle: $(-17,-2)$

$(x+8)^2+(y+5)^2=90$

$r=\sqrt{(-17+8)^2+(-2+5)^2}=\sqrt{81+9}=\sqrt{90}$

123)

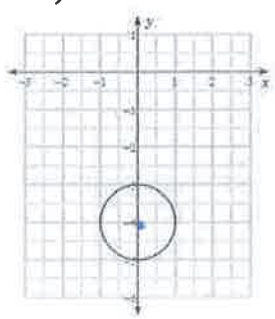


$(-4,-4)$

$r=3$

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

124)



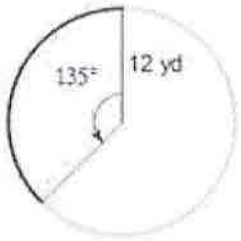
$C(-4,0)$

$r=1$

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

Find the length of each arc. Round your answers to the nearest tenth.

125)

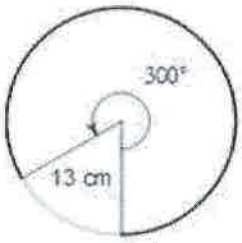


$\frac{x}{2\pi(12)} = \frac{135}{360}$

$360x = 10178.7516$

$x = 28.3\text{ yd}$

126)



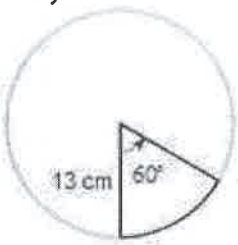
$\frac{x}{2\pi(13)} = \frac{300}{360}$

$360x = 24504.402$

$x = 68.1\text{ cm}$

Find the area of each sector. Round your answer to the nearest tenth.

127)

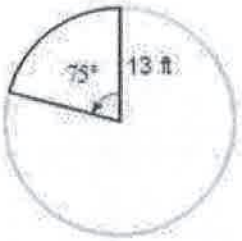


$\frac{A}{\pi(13)^2} = \frac{60}{360}$

$360A = 31855.7226$

$A = 88.4\text{cm}^2$

128)



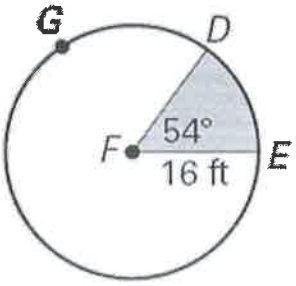
$\frac{A}{\pi(13)^2} = \frac{75}{360}$

$360A = 39819.6532$

$A = 110.6\text{ ft}^2$

Find the areas of the sectors formed by $\angle DFE$. Round answers to the nearest tenth. Also find the length of arc DE.

129)



arc:

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

$360x = 5428.66752$

$x = 15.1\text{ ft}$

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

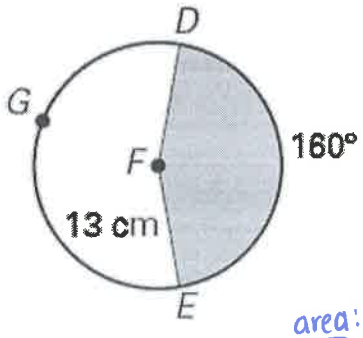
area:

$\frac{A}{\pi(16)^2} = \frac{54}{360}$

$360A = 43429.3402$

$A = 120.6\text{ ft}^2$

130)



arc:

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

$360x = 13069.0144$

$x = 36.3\text{ cm}$

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

area:

$\frac{A}{\pi(13)^2} = \frac{160}{360}$

$360A = 84948.5936$

$A = 235.97\text{cm}^2$

131) How can you convert a radian measure to degrees?

multiply by $\frac{180}{\pi}$

132) How can you convert a degree measure to radians?

multiply by $\frac{\pi}{180}$

133) Convert 40° to radians.

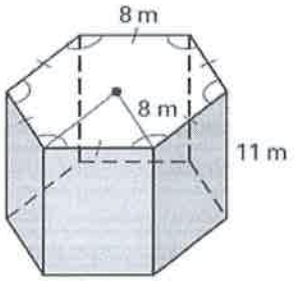
$40 \cdot \frac{\pi}{180} = \frac{40\pi}{180} = \frac{4\pi}{18} = \boxed{\frac{2\pi}{9}}$

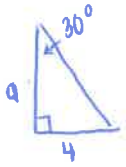
134) Convert $\frac{11\pi}{3}$ radians to degrees

$\frac{11\pi}{3} \cdot \frac{180}{\pi} = \frac{1980}{3} = \boxed{660^\circ}$

Unit 8 Surface Area and Volume Formulas

135) Find the surface area and volume of the right hexagonal prism.





$a = 6.92$

$P = 48$

$B = \frac{1}{2}(6.92)(48) = 166.277$

$h = 11$

$V = Bh$

$= (166.277)(11)$

$\boxed{V = 1829.05\ m^3}$

$SA = 2B + Ph$

$= 2(166.277) + (48)(11)$

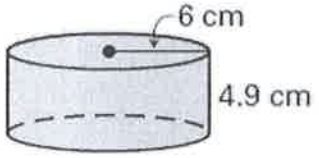
$= 332.554 + 528$

$\boxed{SA = 860.55\ m^2}$

$\frac{\tan 30}{1} = \frac{4}{a}$

$a = \frac{4}{\tan 30} = 6.92$

136) Find the surface area and volume of the right cylinder.



$V = \pi r^2 h$

$= \pi(6)^2(4.9)$

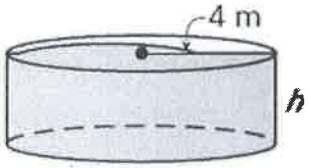
$V = 554.18\ cm^3$

$SA = 2\pi r^2 + 2\pi rh$

$= 2\pi(6)^2 + 2\pi(6)(4.9)$

$SA = 410.92\ cm^2$

137) Find the height of the right cylinder shown, which has a surface area of 168.09 square meters.



$SA = 2\pi rh + 2\pi r^2$

$168.09 = 2\pi(4)h + 2\pi(4)^2$

$168.09 = 25.13h + 100.53$

$67.56 = 25.13h$

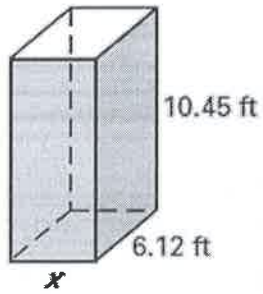
$h = 2.69\ m$

138) Solve for x given the surface area of the right prism is 274.39 ft^2. Round your answer to two decimal places.

$B = (10.45)(6.12) = 63.954$

$P = 33.14$

$h = x$



$SA = 2B + Ph$

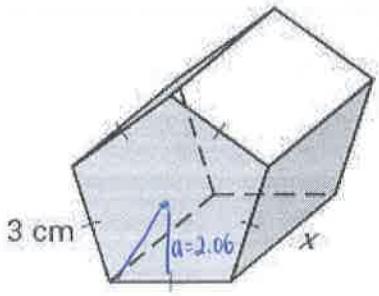
$274.39 = 2(63.954) + 33.14x$

$274.39 = 127.908 + 33.14x$

$146.482 = 33.14x$

$x = 4.42\ ft$

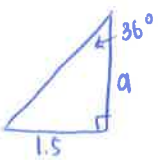
139) The volume of solid below is 78 cm^3. Solve for x.



$V = Bh$

$78 = 15.45x$

$x = 5.05\ cm$



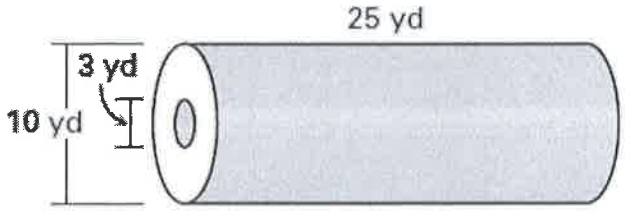
$\tan 36 = \frac{1.5}{a}$

$a = 2.06$

$P = 15$

$B = \frac{1}{2}(15)(2.06) = 15.45$

140) Find the surface area and the volume of the solid.



$V_{outer} = \pi r^2 h$
$= \pi(5)^2(25)$
$= 1963.495$

$V_{inner} = \pi(1.5)^2(25)$
$= 176.715$

Total Vol $= 1963.495 - 176.715$

$V = 1786.78 yd^3$

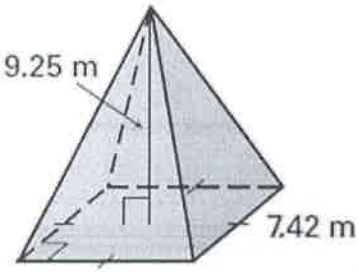
$S_{out} = a\pi r^2 + a\pi rh$
$= a\pi(5)^2 + a\pi(5)(25)$
$= 942.478 - a\pi(1.5)^2$
$= 928.34$

$S_{inner} = a\pi rh$
$= a\pi(1.5)(25)$
$= 235.619$

Total SA $= 928.34 + 235.619$

$SA = 1163.96 yd^2$

141) Find the surface area and the volume of the pyramid.

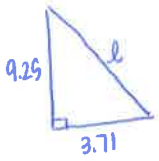


$V = \frac{1}{3}Bh$
$= \frac{1}{3}(55.0564)(9.25)$

$V = 169.76 m^3$

$SA = \frac{1}{2}Pl + B$
$= \frac{1}{2}(29.68)(9.966) + 55.0564$
$= 147.8954 + 55.0564$

$SA = 202.95 m^2$

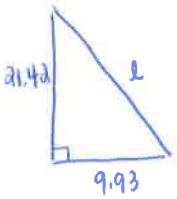


$3.71^2 + 9.25^2 = l^2$
$13.7641 + 85.5625 = l^2$
$99.3266 = l^2$
$l = 9.966$

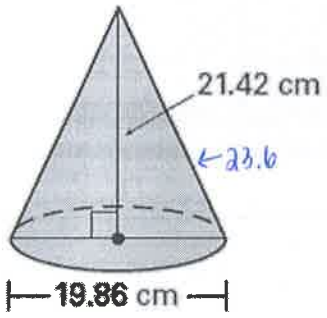
$B = (7.42)(7.42) = 55.0564$

$P = 7.42 \cdot 4 = 29.68$

142) Find the surface area and volume of the cone.



$9.93^2 + 21.42^2 = l^2$
$557.4213 = l^2$
$l = 23.6$



$r = 9.93$

$V = \frac{1}{3}\pi(9.93)^2(21.42)$

$V = 2210.8 cm^3$

$SA = \pi rl + \pi r^2$
$= \pi(9.93)(23.6) + \pi(9.93)^2$

$SA = 1046 cm^2$

143) 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?

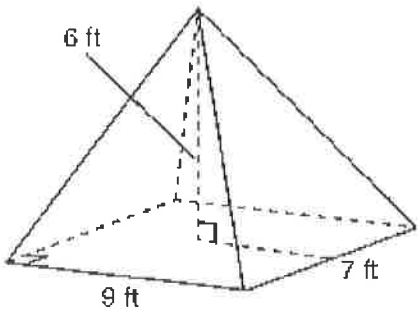
$B = (4)(4) = 16$

$h = 3.5$

$V = Bh$
$= (16)(3.5)$

$V = 56 ft^3$

144) The volume of the pyramid below is _____.



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

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

$V = 126\ ft^3$

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

$h = 6$

145) Describe what happens to the volume of a cone if its radius is doubled while its height is halved. The volume is _____.

[A] unchanged

[B] doubled

[C] increased by a factor of $\frac{1}{3}$

[D] not able to be determined

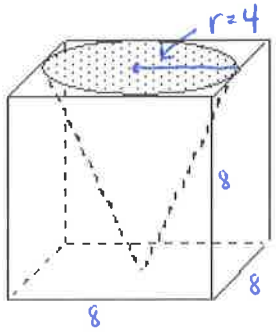
$r = 4$, $h = 10$: $V = \frac{1}{3}\pi(4)^2(10) = 167.55$

$r = 8$, $h = 5$: $V = \frac{1}{3}\pi(8)^2(5) = 335.10$

$\frac{335.10}{167.55} = 2$

146) 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.



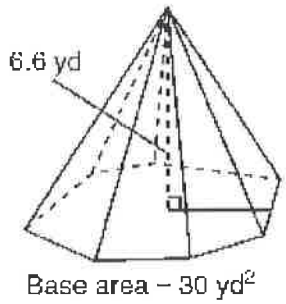
$V_{cube} = (8)(8)(8) = 512$

$V_{cone} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(4)^2(8) = 134.04$

Total Vol $= 512 - 134.04$

$= 377.96\ cm^3$

147) 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.

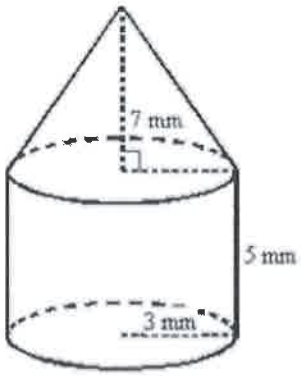


$V = \frac{1}{3}Bh$

$= \frac{1}{3}(30)(6.6)$

$= 66\ yd^3$

148) Find the volume of the figure to the nearest tenth.



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

$= \pi(3)^2(5)$

$= 141.37$

$V_{cone} = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi(3)^2(7)$

$= 65.97$

Total Vol $= 141.37 + 65.97$

$= 207.34\ mm^3$

149) Find the volume, to the nearest cubic foot, of a sphere whose surface area is 100 ft^2.

$SA = 4\pi r^2$

$100 = 4\pi r^2$

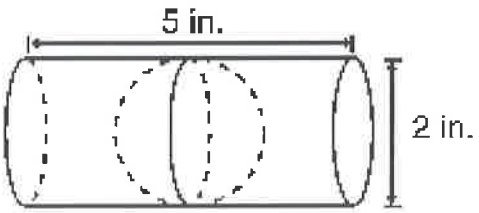
$7.96 = r^2$

$r = 2.82$

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

$V = 93.9 \approx 94\ ft^3$

150) 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.



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

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

$= 15.7$

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

$= 4.19$

Total Vol $= 15.7 - 4.19$

$= 11.52\ in^3$