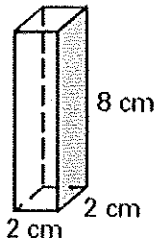
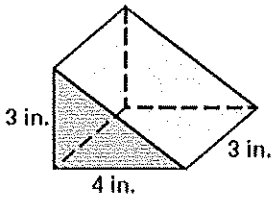
*Find the Surface Area **and** Volume of each right prism. Round to the hundredth if necessary.*

3) **Find the Surface Area, Lateral Area, and Volume for the following solids. Give an exact answer.**

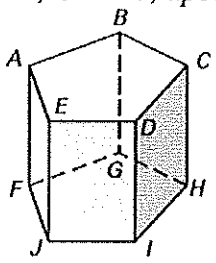
a.



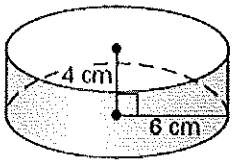
b.



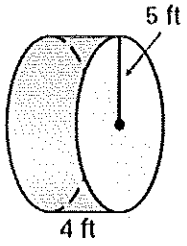
c. *BC = 12, CH = 5, apothem = 6.2*



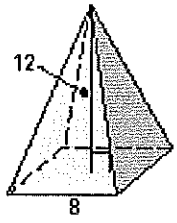
d.



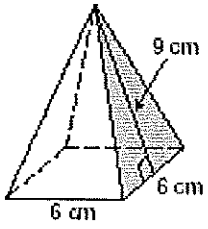
e.



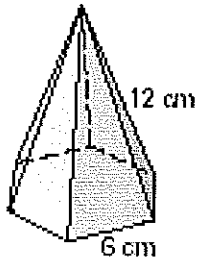
f.



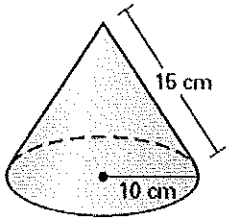
g.



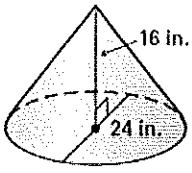
h. *apothem = 5.2 cm*



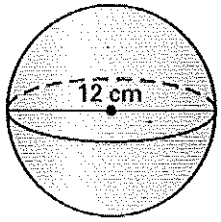
i.



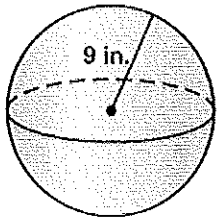
j.



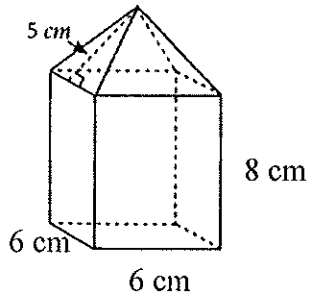
k.



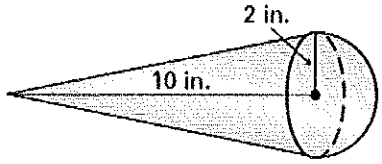
l.



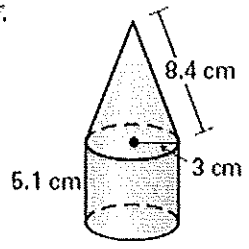
m.



n.



o.



See next pages

a.) SA = 72 cm^2
V = 32 cm^3

b.) SA = 48 in^2
V = 18 in^3

c.) SA = 672 $units^2$
V = 930 $units^3$

d.) SA = 376.99 cm^2
V = 452.39 cm^3

e.) SA = 282.74 ft^2
V = 314.16 ft^3

f.) SA = 266.4 $units^2$
V = 256 $units^3$

g.) SA = 144 cm^2
V = 101.88 cm^3

h.) SA = 258 cm^2
V = 302.12 cm^3

i.) SA = 785.4 cm^2
V = 1170.77 cm^3

j.) SA = 1206.37 in^2
V = 2412.74 in^3

k.) SA = 452.39 cm^2
V = 904.78 cm^3

l.) SA = 1017.88 in^2
V = 3053.63 in^3

Composites: m) SA = 296 cm^2
V = 336 cm^3

n) SA = 89.22 in^2
V = 50.27 in^3

o) SA = 203.58 cm^2
V = 218.18 cm^3

See next pages for Surface Area & Volume Worked out Solutions

Geo 22 Final Review KEY p. 12 SA and V.

a.) Rect. Prism

SA

$SA = ph + 2B$

$p: 2(4) = (8)$

$h: (8)$

$B = s^2 = 2^2 = (4)$

$SA = 8(8) + 2(4)$

$= 64 + 8$

$= \boxed{72\text{cm}^2}$

V

$V = Bh$

$B = (4)$

$h = (8)$

$V = 4(8)$

$= \boxed{32\text{cm}^3}$

b.) Tri. Prism

SA

$SA = ph + 2B$

$3^2 + 4^2 = c^2$

$\sqrt{25} = \sqrt{c^2}$

$c = 5 \rightarrow$ 3rd side of base

$p: 3+4+5 = (12)$

$h: (3)$

$B: \frac{3 \cdot 4}{2} = (6)$

$SA = 12(3) + 2(6)$

$= \boxed{48\text{in}^2}$

V

$V = Bh$

$= 6(3)$

$= \boxed{18\text{in}^3}$

c.) Pent. Prism

SA

$SA = ph + 2B$

$p: 12(5) = (60)$

$h: (5)$

$B = \frac{ap}{2} = \frac{6 \cdot 2 \cdot 60}{2}$

$= (186)$

$SA = 60(5) + 2(186)$

$= 300 + 372$

$= \boxed{672\text{ units}^2}$

V

$V = Bh$

$= 186(5)$

$= \boxed{930\text{ units}^3}$

d.) Cylinder

SA

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

$= 2\pi(6)(4) + 2\pi(6)^2$

$= 48\pi + 72\pi$

$= 120\pi = \boxed{376.99\text{cm}^2}$

V

$V = \pi r^2 h$

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

$= 144\pi$

$= \boxed{452.39\text{cm}^3}$

12 a, b, c, d

e) Cylinder

SA

$SA = 2\pi(5)(4) + 2\pi(5)^2$

$= 40\pi + 50\pi$

$= 90\pi = \boxed{282.74\ ft^2}$

V

$V = \pi r^2 h$

$= \pi(5)^2(4)$

$= 100\pi$

$= \boxed{314.16\ ft^3}$

f) Pyramid

SA

$SA = \frac{p\ell}{2} + B$

* need slant height

$4^2 + 12^2 = \ell^2$

$16 + 144 = \ell^2$

$\ell = (12.65)$

$p = 8(4) = (32)$

$B = 8^2 = (64)$

$SA = \frac{32 \cdot 12.65}{2} + 64$

$= \boxed{266.4\ units^2}$

V

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

$= \frac{64 \cdot 12}{3}$

$= \boxed{256\ units^3}$

g.) Pyramid

$SA = \frac{p\ell}{2} + B$

$p: 6(4) = (24)$

$\ell: (9)$

$B: 6^2 = (36)$

$SA = \frac{24 \cdot 9}{2} + 36$

$= \boxed{144\ cm^2}$

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

* need height

$3^2 + h^2 = 9^2$

$9 + h^2 = 81$

$h = (8.49)$

$B = (36)$

$V = \frac{36 \cdot 8.49}{3}$

$= \boxed{101.88\ cm^3}$

h.) Hex. Pyramid

SA

$p: 6(6) = (36)$

$\ell: (12)$

$B: \frac{ap}{2} = \frac{5.2 \cdot 36}{2}$

$= (93.6)$

$SA = \frac{36 \cdot 12}{2} + 93.6$

$= \boxed{309.6\ cm^2}$

V

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

$B = (93.6)$

* need height

$3^2 + h^2 = 12^2$

$9 + h^2 = 144$

$h = (11.62)$

$V = \frac{93.6(11.62)}{3} = \boxed{362.5\ cm^3}$

12 e, f, g, h

i.) Core

SA

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

$= \pi(10)(15) + \pi(10)^2$

$= 150\pi + 100\pi$

$= 250\pi = \boxed{785.40\,cm^2}$

V

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

*need height

$10^2 + h^2 = 15^2$

$100 + h^2 = 225$

$h = (11.18)$

$V = \frac{\pi(10)^2(11.18)}{3}$

$= 372.67\pi$

$= \boxed{1170.77\,cm^3}$

j.) Core

*need slant height

$12^2 + 16^2 = l^2$

$l = (20)$

$SA = \pi(12)(20) + \pi(12)^2$

$= 240\pi + 144\pi$

$= 384\pi = \boxed{1206.37\,in^2}$

$V = \frac{\pi(12)^2(16)}{3}$

$= \frac{2304\pi}{3} = \boxed{2412.74\,in^3}$

K.) Sphere

SA

$SA = 4\pi r^2$

$= 4\pi(6)^2$

$= 144\pi = \boxed{452.39\,cm^2}$

V

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

$= \frac{4\pi(6)^3}{3}$

$= 288\pi = \boxed{904.78\,cm^3}$

l.) Sphere

$SA = 4\pi(9)^2$

$= 324\pi = \boxed{1017.88\,in^2}$

$V = \frac{4\pi(9)^3}{3}$

$= 972\pi = \boxed{3053.63\,in^3}$

12. i, j, K, l

m.

Composites

SA

① Rect. Prism

$SA = ph + B$

$p: 6(4) = 24$

$h = 8$

$B = 6^2 = 36$

$SA = 24(8) + 36$

$= 228$

② Pyramid

$SA = \frac{pl}{2}$

$= \frac{24(5)}{2}$

$= 60$

Entire Figure

$228 + 60 = 288\ cm^2$

V

① Rect. Prism

$V = Bh$

$= 36(8)$

$= 288$

② Pyramid

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

* need height

$3^2 + h^2 = 5^2$

$h = 4$

$V = \frac{36(4)}{3}$

$= 48$

Entire Figure

$288 + 48 = 336\ cm^3$

12. m

n.

~~14.~~ SA

① Cone

$SA = \pi r l$

*need slant height

$2^2 + 10^2 = l^2$

$l = 10.20$

$SA = \pi(2)(10.20)$

$= 64.09$

② Hemisphere

$SA = 2\pi r^2$

$= 2\pi(2)^2$

$= 25.13$

Entire Figure

$64.09 + 25.13 = 89.22 in^2$

V

① Cone

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

$= \frac{\pi(2)^2(10)}{3}$

$= 41.89$

② Hemisphere

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

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

$= 16.76$

*Then cut in half

Entire Figure

$41.89 + 16.76 = 58.65 cm^3$

~~15.~~ 0

SA

① Cylinder

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

$= 2\pi(3)(5.1) + \pi(3^2)$

$= 124.41$

② Cone

$SA = \pi r l$

$= \pi(3)(8.4)$

$= 79.17$

Entire Figure

$124.41 + 79.17 = 203.58 cm^2$

V

① Cylinder

$V = \pi(3)^2(5.1)$

$= 144.2$

$= 45.9\pi$

② Cone

$V = \frac{\pi r^2 h}{3}$ → $V = \frac{\pi(3^2)(7.85)}{3}$

*need height

$3^2 + h^2 = 9.4^2$

$h = 7.85$

$= 73.98$

$= 23.55\pi$

Entire Figure

$144.2 + 73.98$

$= 218.18 cm^3$

12 n, 120

4) *Find the unknown value for the right cylinder with radius r, height h, and surface area S.*

a) $r =$ 1.038, $h = 14$, $S = 98$

b) $r = 1.6$, $h =$ 0.95, $S = 86$

$98 = 2\pi r(14) + 2\pi r^2$

$98 = 28\pi r + 2\pi r^2$

$\frac{98}{2\pi} = \frac{2\pi}{2\pi}(14r + r^2)$

$r^2 + 14r - 15.6 = 0$

5) *Find the unknown value for the right cylinder with radius r, height h, and volume V.*

a) $r = 10$, $h =$ 0.40, $V = 144$

b) $r =$ 1.20, $h = 16$, $V = 80$

$V = \pi r^2 h$

$144 = \pi 10^2 h$

$\frac{144}{100\pi} = \frac{100\pi h}{100\pi}$

6) *The dimensions of Box A are 2" by 6" by 10" and the dimensions of Box B are 3" by 5" by 8".*

a) Find the difference in volumes of A and B 120 − 120.

Both boxes have the same volume 120 in³

b) Find the difference in surface areas of A and B 184 − 158

Box A has a SA that is 26 in² larger

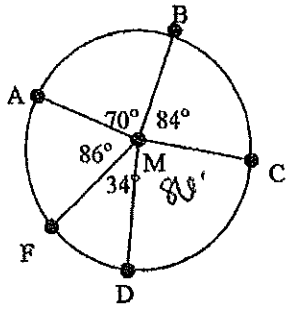
c) Find the ratio of Surface Areas of A to B 92 : 79

7) If the ratio of Volumes of two prisms is $\frac{8}{27}$ and the edge of the smaller prism is 20 inches, what is the length of the corresponding edge in the larger prsim? $x = 30$ in.

$\frac{a}{b} = \frac{2}{3}$ $\frac{2}{3} = \frac{20}{x}$ $2x = 60$

Section 9

1) *Find the degree measures of each arc or angle by using the central angle measures given in ⊙M*



a) $m\widehat{AC}$ 154°

b) $m\widehat{FA}$ 80°

c) $m\widehat{CBF}$ 240°

d) $m\widehat{DB}$ 80°

e) $m\widehat{ADC}$ 206°

f) $m\widehat{DCA}$ 240°

g) $m\angle DMC$ 80°

2) *Determine the missing value of an arc with length L, in a circle with radius r, and degree measure M.*

a) $L = 15$, $r = 12$, $M =$ 71.02°

b) $L = \frac{34}{3}\pi$ in, $r = 8.5$, $M = 240°$

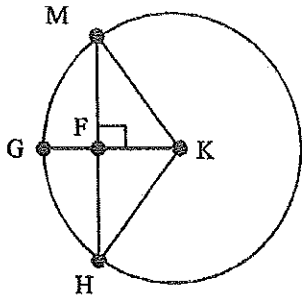
$11\frac{1}{3}\pi$

11.33π

13

13

3) *Refer to ⊙K, in which $\overline{KG} \perp \overline{MH}$ at F for the following.*



a) $\overline{MF} \cong$ FH why? chord is bisected

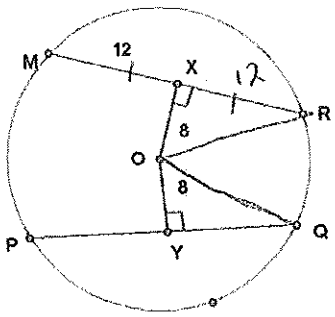
b) $\overline{KG} \cong$ MK and KH why? All radii ≅

c) If KH = 2 and KF = 1, what is MF? √3 or 1.73

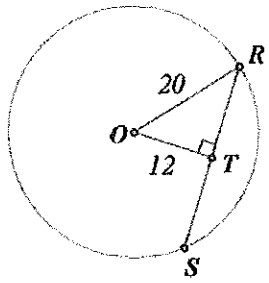
d) If MK = 5 and GF = 2, what is FH? 4

4) Find the indicated measure.

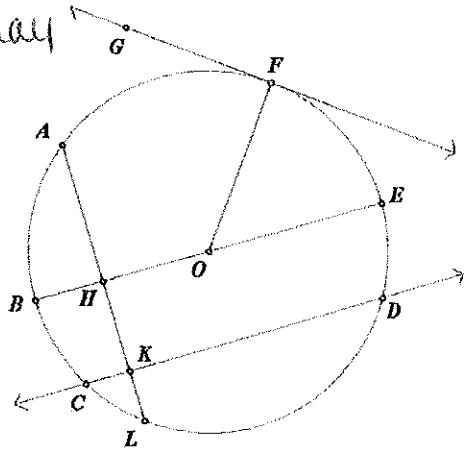
a) $OQ =$ 14.42
(O is the center of the circle)



b) $RS =$ 32
(O is the center of the circle)

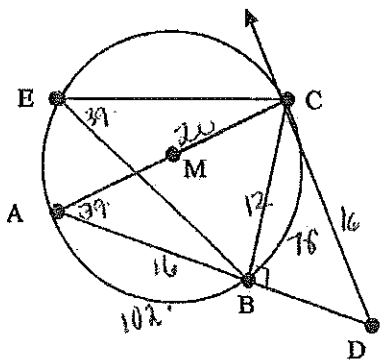


5) Using circle *O* below, name the following: answers may vary



a. Chord $\overline{AL}$, $\overline{CD}$
b. Diameter $\overline{BE}$
c. Central Angle ∠FOE, ∠BOF
d. Minor Arc $\overset{\frown}{AF}$, $\overset{\frown}{FE}$
e. Major Arc $\overset{\frown}{BEL}$
f. Semicircle $\overset{\frown}{BFE}$
g. Radius $\overline{OF}$
h. Tangent $\overleftrightarrow{GF}$
i. Point of Tangency F

6) For the following, in ⊙*M*, $\overline{AC}$ is the diameter, $\overline{DC}$ is tangent to the circle at point *C*, and $m\overset{\frown}{BC} = 78°$.



a) $m\angle BAC$ 39° b) $m\angle BEC$ 39°

c) $m\overset{\frown}{AB}$ 102° d) $m\angle ACB$ 51°

e) $m\angle ABC$ 90° f) $m\angle ACD$ 90°

*g) $\overset{\frown}{EC}$ is a minor arc, $\overset{\frown}{ACB}$ is a major arc

h) $\overline{MA}$ is a radius, $\overline{AC}$ is a diameter.

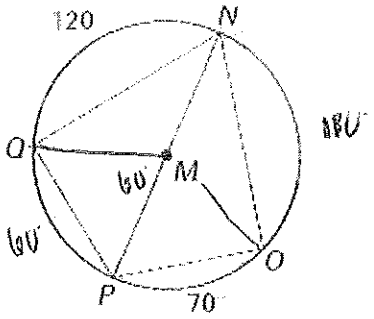
i) $\overleftrightarrow{CD}$ is a tangent, $\overline{EC}$ is a chord.

In ⊙*M*, if BC = 12, CD = 16, and AC = 20, find the following:

j) BD = 10.68 k) AD = 26.58

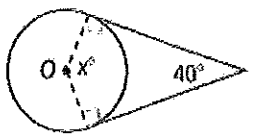
Find the measure of the arc or angle in $\odot M$.

7. $m\angle QMP$ 60°
8. $m\angle NMO$ 110°
9. $m\angle PNO$ 35°
10. $m\angle QNP$ 30°
11. mQO 130°
12. $mNOP$ 90°
13. mPQ 60°
14. $mOQN$ 250°



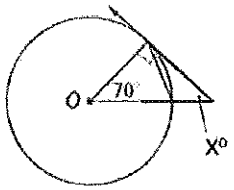
15) What is the value of x? Lines that appear to be tangent are tangent. Round to the nearest hundredth if necessary.

a)



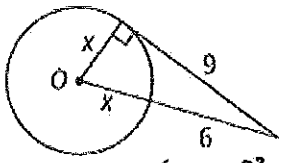
$x=140°$

b)



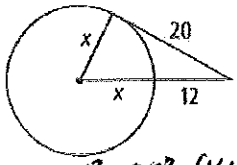
$x=20°$

c)



$x^2+9^2=(x+6)^2$
$x^2+81=x^2+12x+36$
$x=3.75$

d0



$x^2+20^2=(x+12)^2$
$x^2+400=x^2+24x+144$
$x\approx 10.67$

16) Write the equation for the circle with center (2, 4) and radius = 7 in

$(x-2)^2+(y-4)^2=49$

17) Write the equation for the circle with center (-3, 1) and diameter = 18 in $r=9$

$(x+3)^2+(y+1)^2=$ ~~324~~ 81

18) Find the center and radius of the circle: $(x-7)^2+(y+12)^2=144$

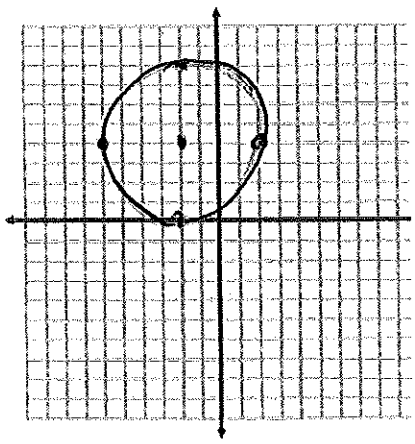
center: $(7,-12)$ $r=12$

19) Find the center and radius of the circle: $(x+5)^2+(y+8)^2=225$

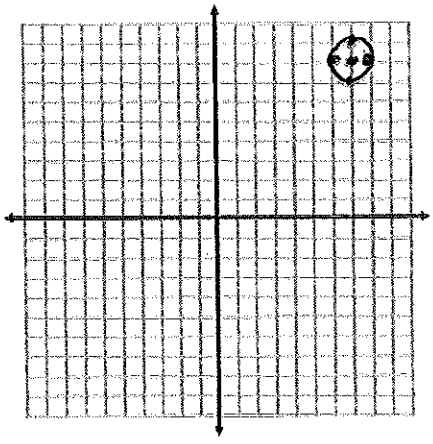
Center $(-5,-8)$ $r=15$

20) Graph the circle on the coordinate plane.

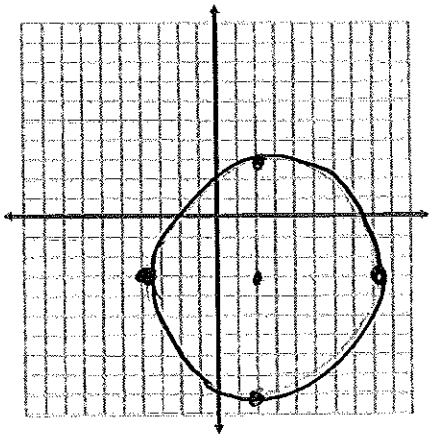
a. $(x+2)^2+(y-4)^2=16$



b. $(x-7)^2+(y-8)^2=1$



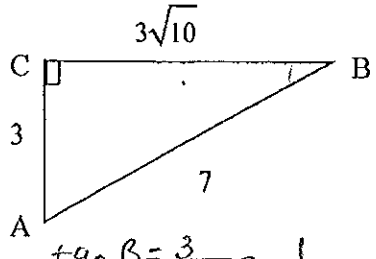
c. $(x-2)^2+(y+3)^2=36$



Section 10

1) Determine the trigonometric ratio. Leave your answers as simplified fractions.

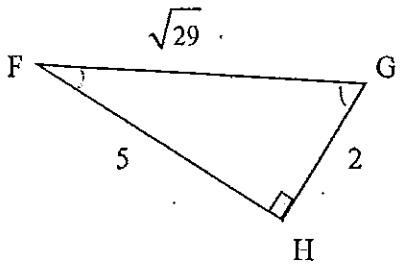
a) $\tan B = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$ b) $\cos A = \frac{3}{7}$ c) $\sin F = \frac{2}{\sqrt{29}} = \frac{2\sqrt{29}}{29}$ d) $\tan G = \frac{5}{2}$



$\cos A = \frac{3}{7}$

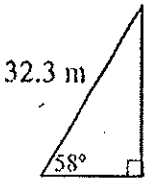
$\tan B = \frac{3}{3\sqrt{10}} = \frac{1}{\sqrt{10}}$

$\sin F = \frac{2}{\sqrt{29}}$



2) Find the marked side of each of the following triangles.

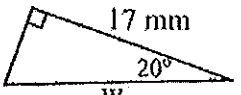
a)



$\cos(58) = \frac{y}{32.3}$

$y = 17.12$

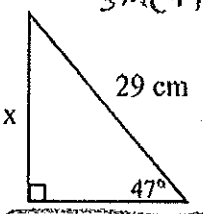
b)



$\cos(20) = \frac{17}{w}$

$w = 18.09$

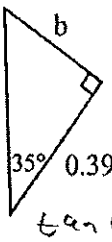
c)



$\sin(47) = \frac{x}{29}$

$x = 21.21$

d)

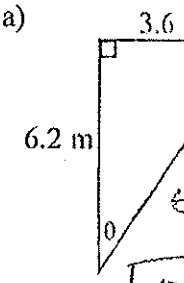


$\tan(35) = \frac{b}{.39}$

$b = 0.27$

3) Find the value for each of the marked angles. ★ Inverse function!

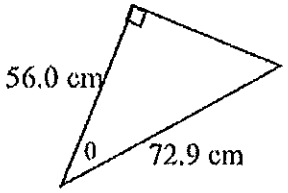
a)



$\tan(\theta) = \frac{3.6}{6.2}$

$\theta = 30°$

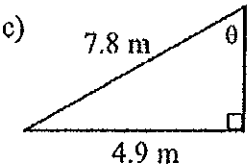
b)



$\cos(\theta) = \frac{56}{72.9}$

$\theta = 40°$

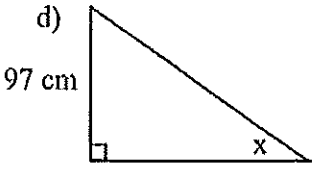
c)



$\sin(\theta) = \frac{4.9}{7.8}$

$\theta = 39°$

d)

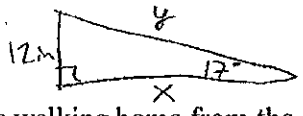


1.28 m = 128 cm

$\tan(\theta) = \frac{97}{128}$

$\theta = 37°$

4) A skateboarding ramp is 12 in. high and rises at an angle of 17°. How long is the base of the ramp? What is the length of the ramp? Round your answer to the nearest inch.



$\tan(17) = \frac{12}{x}$

$x = 39$ in → base

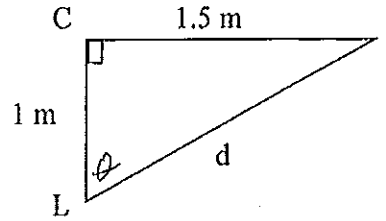
$\sin(17) = \frac{12}{y}$

$y = 41$ in → length

5) Joey is walking home from the library. He can walk for 1 mile along the street, then turn right and walk 1.5 miles along another street; or he can cut across a large field straight to his house. At what angle, θ, should he head off from the library, and how far, d, should he cut across the field?

$\theta =$ 56°

$d =$ 1.8 m



$\tan(\theta) = \frac{1.5}{1}$

$\theta = 56°$

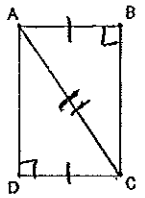
$\sin(56) = \frac{1.5}{d}$

$d = 1.8$

16

Proofs

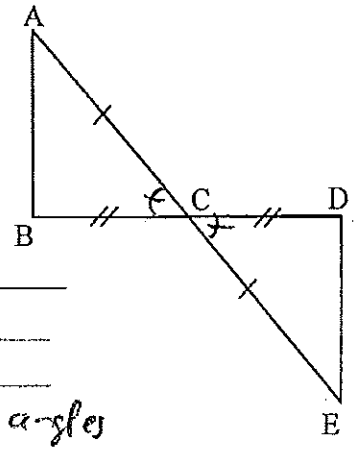
1) Given: $\angle B$ and $\angle D$ are right angles, $\overline{AB} \cong \overline{CD}$
Prove: $\angle DAC \cong \angle BCA$



Statements	Reasons
1. $\angle B$ and $\angle D$ are right angles, $\overline{AB} \cong \overline{CD}$	1. Given
2. ΔADC and ΔCBA are right triangles	2. Definition of Right Triangles
3. $\overline{AC} \cong \overline{CA}$	3. Reflexive Property of Congruence
4. $\Delta ADC \cong \Delta CBA$	4. Hypotenuse Leg Theorem
5. $\angle DAC \cong \angle BCA$	5. Corresponding Parts of Congruent Triangles are Congruent

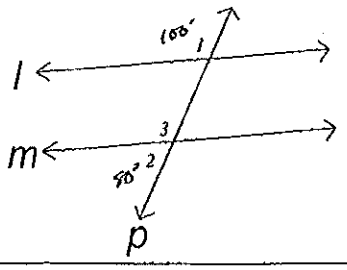
2)

Fill in the blanks in the table below to prove
$\angle CBA \cong \angle CDE$



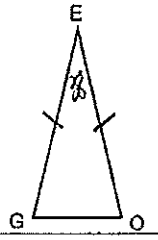
Statement	Reason
$\overline{CB} \cong \overline{DC}$ $\overline{CD}$	Given
$\overline{CA} \cong \overline{CE}$	Given
$\angle BCA$&$\angle DCE$ are vertical angles	Definition of vertical angles
$\angle BCA \cong \angle DCE$	Vertical Angle Theorem
$\Delta BCA \cong \Delta DCE$	Side-Angle-Side Theorem
$\angle CBA \cong \angle CDE$	Corresponding Parts of congruent Triangles are congruent

3) Given: $m\angle 1 = 100°$, $m\angle 2 = 80°$
Prove: $l \parallel m$



Statements	Reasons
1. $m\angle 1 = 100°$, $m\angle 2 = 80°$	1. Given
2. $\angle 2$ and $\angle 3$ form a linear pair	2. Definition of Linear Pair
3. $\angle 2$ and $\angle 3$ are supplementary	3. Linear Pair Property
4. $m\angle 2 + m\angle 3 = 180°$	4. Definition of supplementary angles
5. $80° + m\angle 3 = 180°$	5. Substitution Property of Equality
6. $m\angle 3 = 100°$	6. Subtraction Property of Equality
7. $m\angle 1 = m\angle 3$	7. Substitution Property of Equality
8. $\angle 1 \cong \angle 3$	8. Definition of Angle Congruence
9. $\angle 1$ and $\angle 3$ are Corresponding Angles	9. Definition of Corresponding Angles
10. $l \parallel m$	10. Converse of Corresponding Angles Theorem

4)
Given: $\overline{GE} \cong \overline{OE}$; $m\angle E = 38°$
Prove: $m\angle G = 71°$



Statements	Reasons
1. $\overline{GE} \cong \overline{OE}$	1. Given
2. $\angle G \cong \angle O$	2. Isosceles Triangle Theorem
3. $m\angle G = m\angle O$	3. Definition of Angle Congruence
4. $m\angle E = 38°$	4. Given
5. $m\angle G + m\angle E + m\angle O = 180°$	5. Triangle Sum Theorem
6. $m\angle G + 38° + m\angle G = 180°$	6. Substitution Property of Equality
7. $2 \cdot m\angle G + 38° = 180°$	7. Combine like terms
8. $2 \cdot m\angle G = 142°$	8. Subtraction Property of Equality
9. $m\angle G = 71°$	9. Division Property of Equality