CCM2 Trigonometry Study Guide

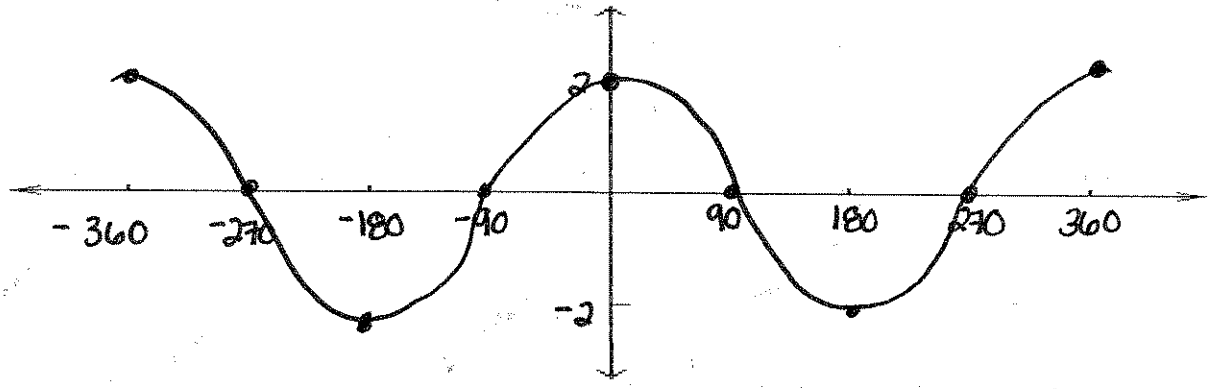
Name key

Date _____ PD: _____

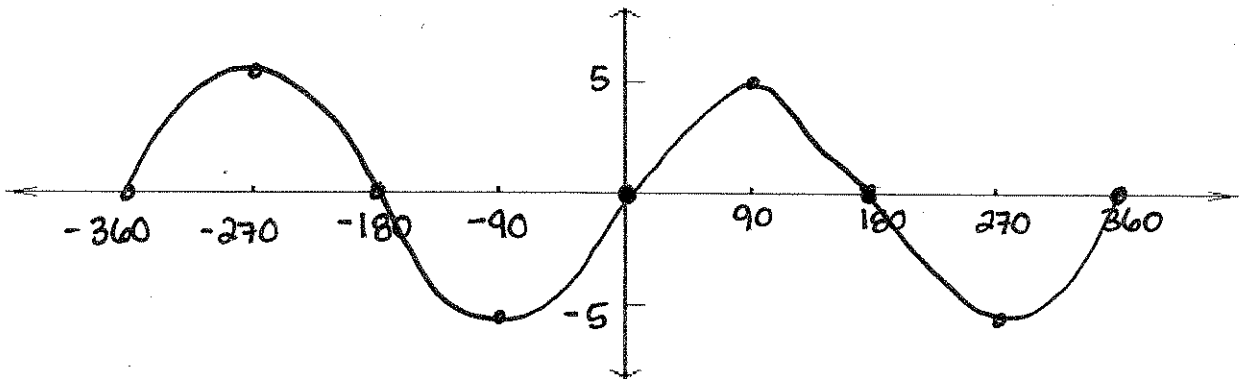
Part I: Graphing Sine and Cosine

Graph the following functions over two periods, one in the positive direction and one in the negative directions. Label the axes appropriately.

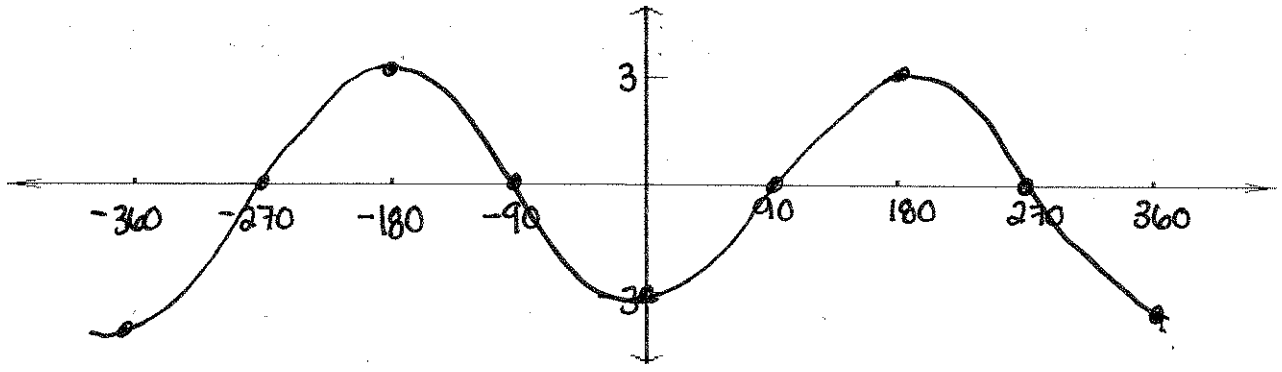
1. $y = 2\cos(x)$ Amplitude: 2 Midline: y=0



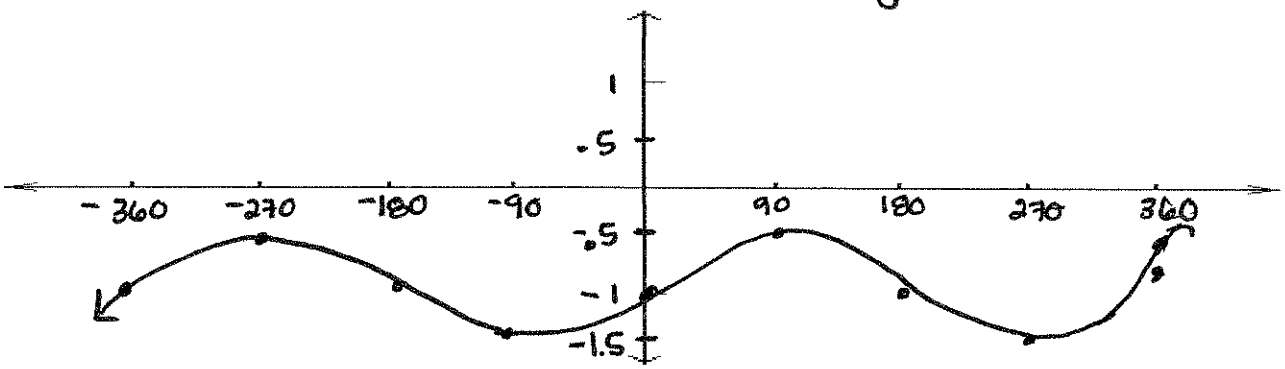
2. $y = 5\sin(x)$ Amplitude: 5 Midline: y=0



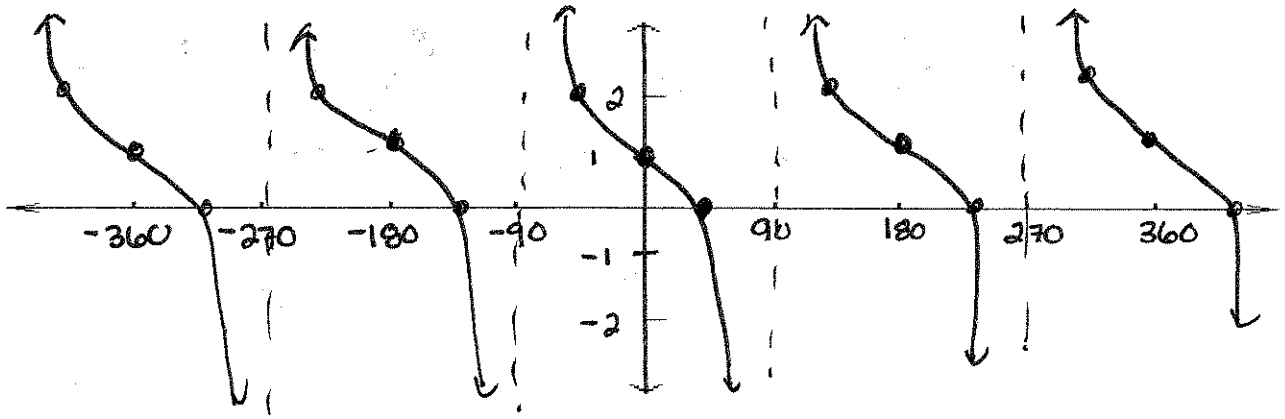
3. $y = -3\cos(x)$ Amplitude: 3 Midline: y=0



4. $y = 0.5\sin(x) - 1$ Amplitude: 1/2 Midline: y=-1

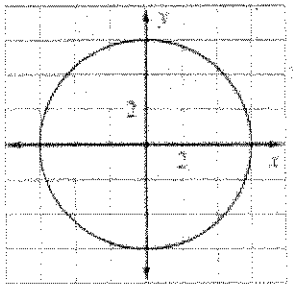


5. $y = -tan\,(x) + 1$ Amplitude: ∅ N/A Midline: y=1

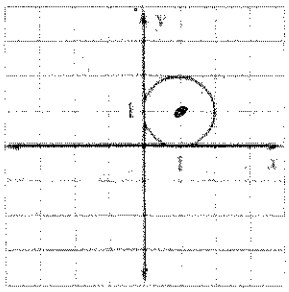


Part II: Equations of Circles Practice

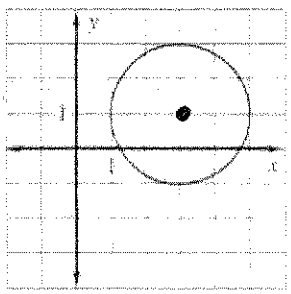
Write the standard equation of the circle.

1. 

$x^2 + y^2 = 36$

2. 

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

3. 

$(x-3)^2 + (y-1)^2 = 4$

Write the standard equation of the circle with the given center and radius.

4. Center (0, 0), radius 9.

$x^2 + y^2 = 81$

5. Center (1, 3), radius 4.

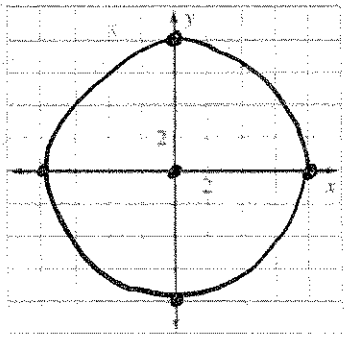
$(x-1)^2 + (y-3)^2 = 16$

6. Center (–3, 0), radius 5.

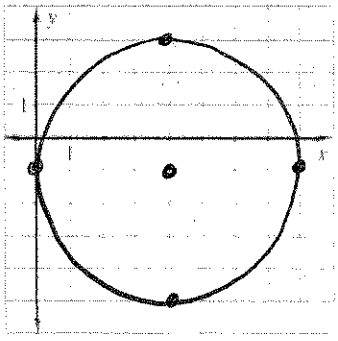
$(x+3)^2 + y^2 = 25$

Graph the equation.

7. $x^2 + y^2 = 64$



8. $(x-4)^2 + (y+1)^2 = 16$



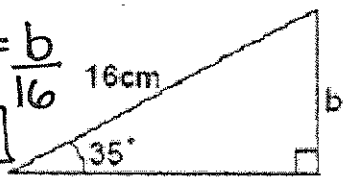
Part III: SOH CAH TOA Practice

Write the trig ratios below.

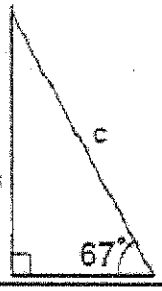
Sin = $\frac{\text{opposite}}{\text{hypotenuse}}$ Cos = $\frac{\text{adjacent}}{\text{hypotenuse}}$ Tan = $\frac{\text{opposite}}{\text{adjacent}}$

Calculate missing sides and missing angles.

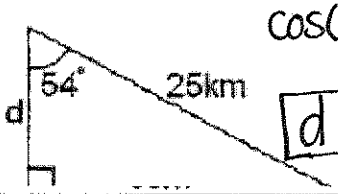
1. $\sin(35) = \frac{b}{16}$ $b = 9.18$



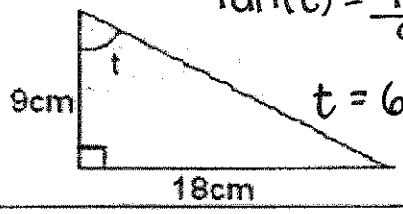
2. $\sin(67) = \frac{8}{c}$ $c = 8.69$



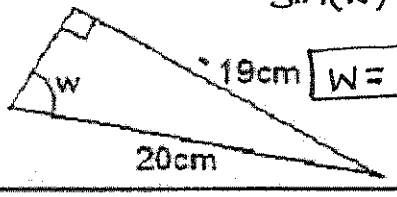
3. $\cos(54) = \frac{d}{25}$ $d = 14.69$



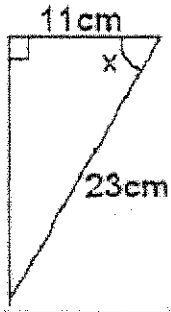
4. $\tan(t) = \frac{18}{9}$ $t = 63.4°$



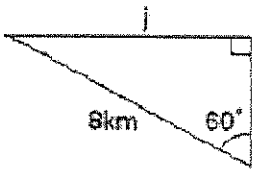
5. $\sin(w) = \frac{19}{20}$ $w = 71.8°$



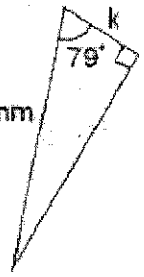
6. $\cos(x) = \frac{11}{23}$ $x = 61.4°$



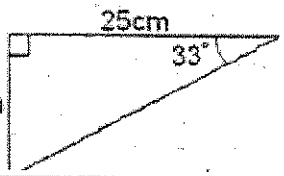
7. $\sin(60) = \frac{j}{8}$ $j = 6.93$



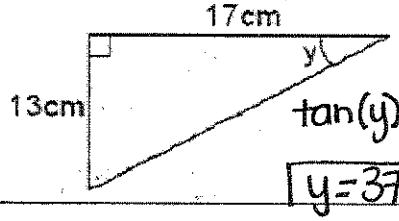
8. $\cos(79) = \frac{k}{15}$ $k = 2.86$



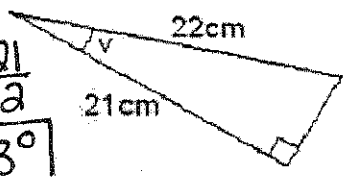
9. $\tan(33) = \frac{m}{25}$ $m = 16.24$



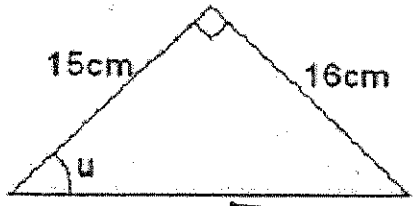
10. $\tan(y) = \frac{13}{17}$ $y = 37.4°$



11. $\cos(v) = \frac{21}{22}$ $v = 17.3°$

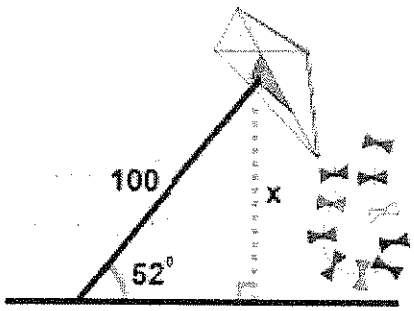


12. $\tan(u) = \frac{16}{15}$ $u = 46.8°$



Part IV: Angles of Elevation & Depression

Find all values to the nearest tenth.



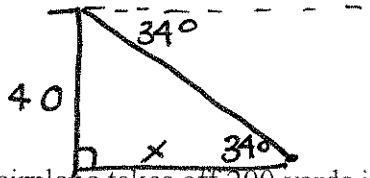
1. A man flies a kite with a 100 foot string. The angle of elevation of the string is 52°. How high off the ground is the kite?

$\sin(52) = \frac{x}{100}$

$x = 100\sin(52)$

$x = 78.8$ ft

2. From the top of a vertical cliff 40 m high, the angle of depression of an object that is level with the base of the cliff is 34°. How far is the object from the base of the cliff?



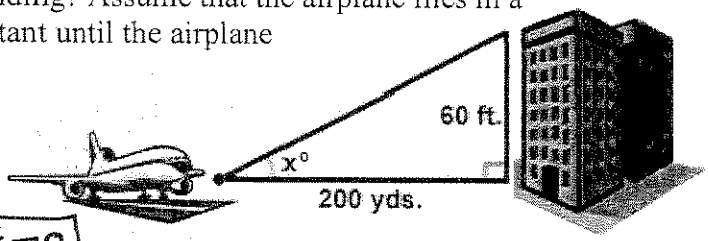
$\tan(34) = \frac{40}{x}$

$x = \frac{40}{\tan(34)}$

$x = 59.3$ m

3. An airplane takes off 200 yards in front of a 60 foot building. At what angle of elevation must the plane take off in order to avoid crashing into the building? Assume that the airplane flies in a straight line and the angle of elevation remains constant until the airplane flies over the building.

HINT: 60ft = 20 yards

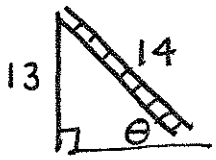


$\tan(x) = \frac{60}{200}$

$x = \tan^{-1}\left(\frac{60}{200}\right)$

$x = 5.7°$

4. A 14 foot ladder is used to scale a 13 foot wall. At what angle of elevation must the ladder be situated in order to reach the top of the wall?

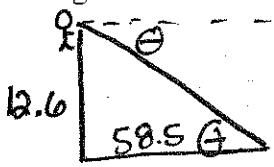


$\sin\theta = \frac{13}{14}$

$\theta = \sin^{-1}\left(\frac{13}{14}\right)$

$\theta = 68.2°$

5. A person stands at the window of a building so that his eyes are 12.6 m above the level ground. An object is on the ground 58.5 m away from the base of the building. Compute the angle of depression of the person's line of sight to the object on the ground.



$\tan\theta = \frac{12.6}{58.5}$

$\theta = \tan^{-1}\left(\frac{12.6}{58.5}\right)$

$\theta = 12.2°$

6. A ramp is needed to allow vehicles to climb a 2 foot wall. The angle of elevation in order for the vehicles to safely go up must be 30° or less, and the longest ramp available is 5 feet long. Can this ramp be used safely?

$\tan(x) = \frac{2}{5}$

$x = \tan^{-1}\left(\frac{2}{5}\right)$

$x = 23.6°$

Yes, angle of elevation is 23.6° which is less than 30°.

Part V: LAW OF SINES PRACTICE

When does a person solve a triangle using the LAW OF SINES?? When do they use the AMBIGUOUS CASE?

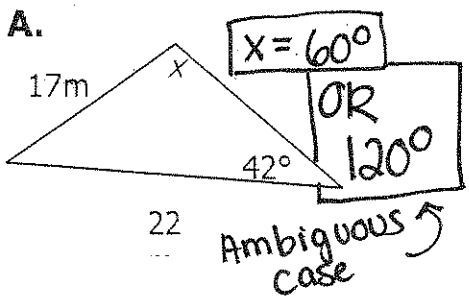
When you are solving for missing sides or angles in non-right triangles & you are given:

AMBIGUOUS CASE ⇓

(A) Angle - Angle - Side (B) Angle - Side - Angle (C) Side-Side-Angle

1. Solve for the unknown in each triangle. Round to the nearest tenth.

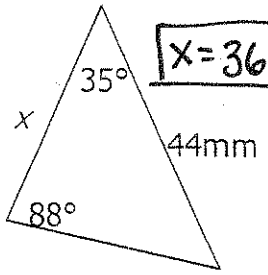
A.



x = 60° OR 120°

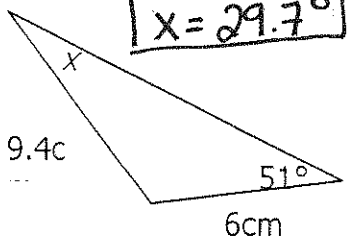
Ambiguous case

B.



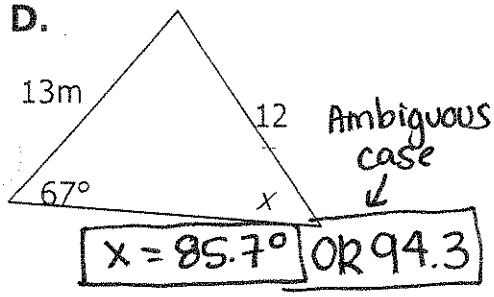
x = 36.9°

C.



x = 29.7°

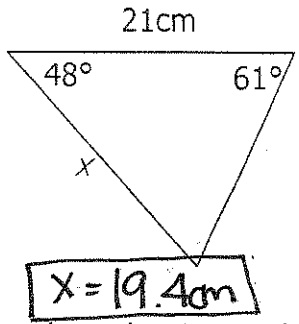
D.



Ambiguous case

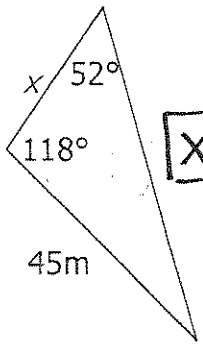
x = 85.7° OR 94.3

E.



x = 19.4cm

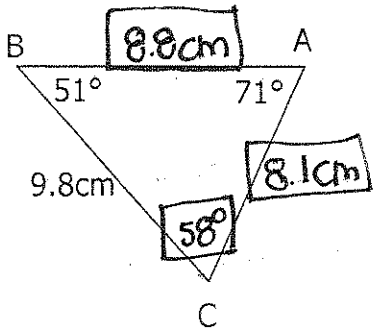
F.



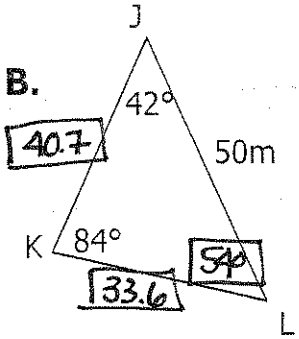
x = 9.9m

2. Solve for **all** missing sides and angles in each triangle. Round to the nearest tenth.

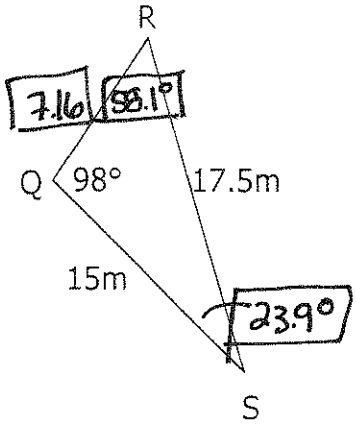
A.



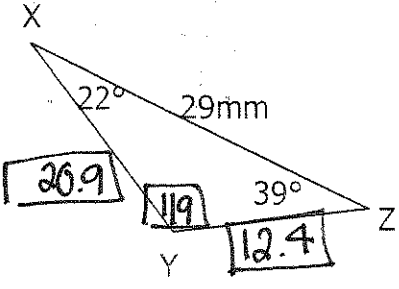
B.



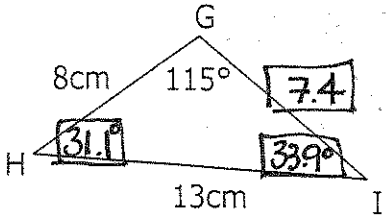
C.



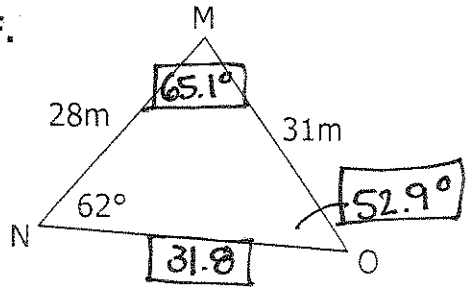
D.



E.



F.

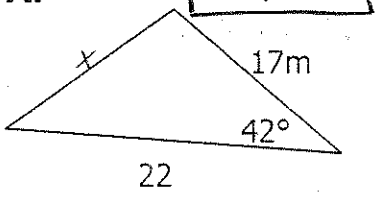


Part VI: LAW OF COSINES PRACTICE

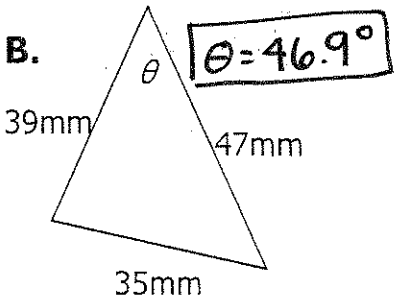
When does a person solve a triangle using LAW OF COSINES???

1. Solve for the unknown in each triangle. Round to the nearest hundredth.

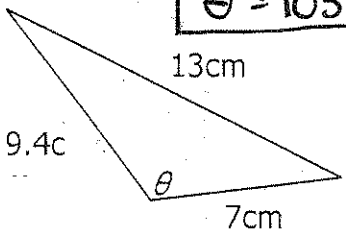
A. $x = 14.7$



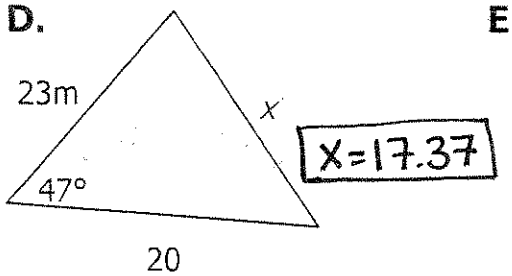
B. $\theta = 46.9°$



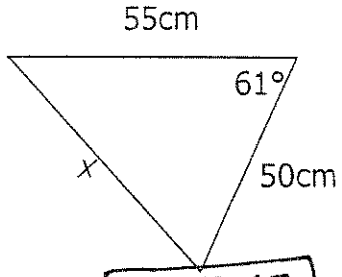
C. $\theta = 103.91°$



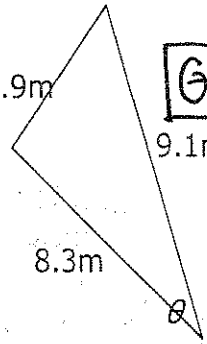
D. $x = 17.37$



E. $x = 52.47$



F. $\theta = 32.30°$



2. Solve for **all** missing sides and angles in each triangle. Round to the nearest hundredth. ** USE PROPER VARIABLES

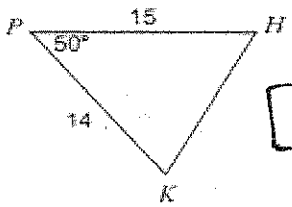
A. ΔXYZ: $x = 29m, y = 15m, \angle Z = 122°$ $z = 39.08 \quad \angle X = 38.99° \quad \angle Y = 19.01°$

B. ΔGHI: $g = 13cm, h = 8cm, i = 15cm$ $\angle G = 60° \quad \angle H = 32.20° \quad \angle I = 87.80°$

C. ΔMNO: $n = 31m, o = 28m, \angle M = 62$ $m = 30.50 \quad \angle N = 63.83° \quad \angle O = 54.16°$

Part VII: Area of Oblique Triangles Practice

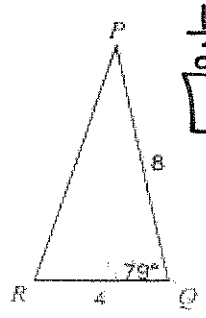
1)



$\frac{1}{2}(15)(14)\sin(50)$

$= 80.4$

2)



$\frac{1}{2}(8)(4)\sin(79)$

$= 15.7$