

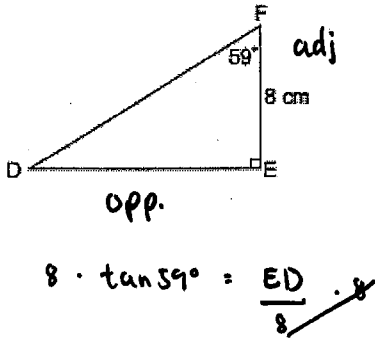
# KEY

## Unit 1 – Final Exam Review

**\*\*YOUR CALCULATOR NEEDS TO BE IN DEGREE MODE\*\***

1. Determine the length of the **side** indicated to the nearest tenth.

a) side **ED**

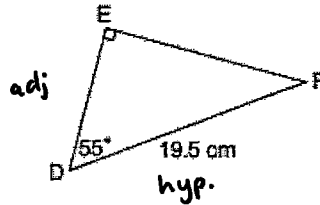


$$\tan \theta = \frac{O}{A}$$

$$8 \cdot \tan 59^\circ = \frac{ED}{8}$$

$$\boxed{ED = 13.3 \text{ cm}}$$

b) side **DE**

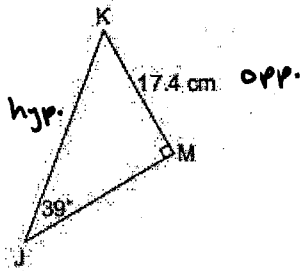


$$\cos \theta = \frac{A}{H}$$

$$\cos 55^\circ = \frac{DE}{19.5}$$

$$\boxed{DE = 11.2 \text{ cm}}$$

c) side **JK**



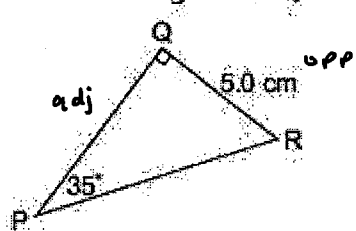
$$\sin \theta = \frac{O}{H}$$

$$\sin 39^\circ = \frac{17.4}{JK}$$

$$JK = \frac{17.4}{\sin 39^\circ}$$

$$\boxed{JK = 27.6 \text{ cm}}$$

d) side **PQ**



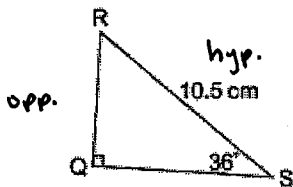
$$\tan \theta = \frac{O}{A}$$

$$\tan 35^\circ = \frac{5.0}{PQ}$$

$$PQ = \frac{5.0}{\tan 35^\circ}$$

$$\boxed{PQ = 7.1 \text{ cm}}$$

e) side **QR**



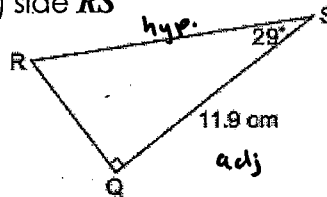
$$\sin \theta = \frac{O}{H}$$

$$\sin 36^\circ = \frac{QR}{10.5}$$

$$QR = \sin 36^\circ \cdot 10.5$$

$$\boxed{QR = 6.2 \text{ cm}}$$

f) side **RS**



$$\cos \theta = \frac{A}{H}$$

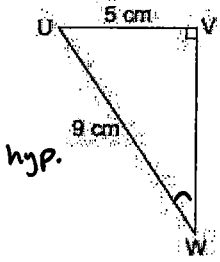
$$\cos 29^\circ = \frac{11.9}{RS}$$

$$RS = \frac{11.9}{\cos 29^\circ}$$

$$\boxed{RS = 13.6 \text{ cm}}$$

2. Determine the measure of each **angle** indicated to the nearest degree.

a)  $\angle W$  opp.



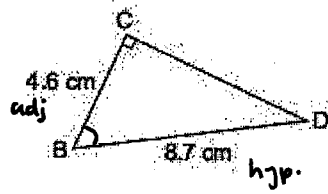
$$\theta = \sin^{-1}\left(\frac{10}{11}\right)$$

$$\angle W = \sin^{-1}\left(\frac{5}{9}\right)$$

$$\angle W = 33.7^\circ$$

$$\boxed{\angle W = 34^\circ}$$

b)  $\angle B$



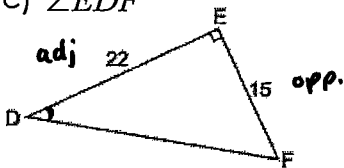
$$\theta = \cos^{-1}\left(\frac{A}{H}\right)$$

$$\angle B = \cos^{-1}\left(\frac{4.6}{8.7}\right)$$

$$\angle B = 58.08^\circ$$

$$\boxed{\angle B = 58^\circ}$$

c)  $\angle EDF$



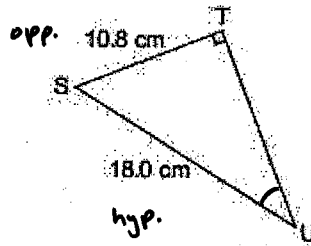
$$\theta = \tan^{-1}\left(\frac{O}{A}\right)$$

$$\angle D = \tan^{-1}\left(\frac{15}{22}\right)$$

$$= 34.29^\circ$$

$$\boxed{\angle D = 34^\circ}$$

d)  $\angle TUS$



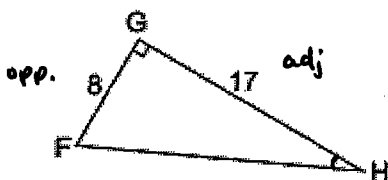
$$\theta = \sin^{-1}\left(\frac{O}{A}\right)$$

$$\angle U = \sin^{-1}\left(\frac{10.8}{18}\right)$$

$$\angle U = 36.87^\circ$$

$$\boxed{\angle U = 37^\circ}$$

e)  $\angle FHG$



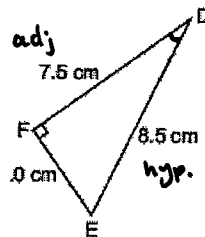
$$\theta = \tan^{-1}\left(\frac{O}{A}\right)$$

$$\angle H = \tan^{-1}\left(\frac{8}{17}\right)$$

$$= 25.2^\circ$$

$$\boxed{\angle H = 25^\circ}$$

f)  $\angle FDE$



$$\theta = \cos^{-1}\left(\frac{A}{H}\right)$$

$$\angle D = \cos^{-1}\left(\frac{7.5}{8.5}\right)$$

$$= 28.07^\circ$$

$$\boxed{\angle D = 28^\circ}$$

3. Solve each problem. Indicate your answers to the nearest tenth, if necessary.

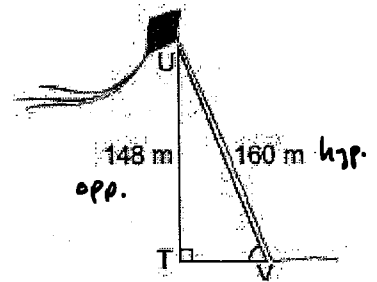
a) A 160 m rope holds a kite. The rope is attached to the kite at a point at V. The kite has a height of 148 m. What is the angle of inclination of the kite, to the nearest degree?

$$\angle V = ?$$

$$\theta = \sin^{-1}\left(\frac{O}{H}\right)$$

$$\angle V = \sin^{-1}\left(\frac{148}{160}\right)$$

$$\boxed{\angle V = 67.7^\circ}$$

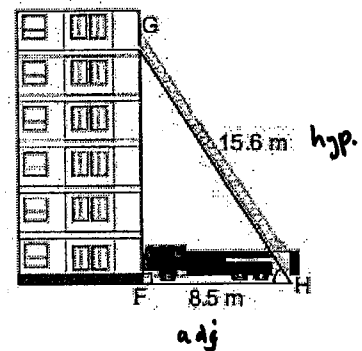


b) A 15.6 m ladder is leaning against the wall of a building. Its foot is 8.5 m from the wall. What angle does the ladder form with the ground, to the nearest degree?

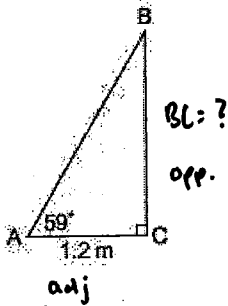
$$\theta = \cos^{-1}\left(\frac{A}{H}\right)$$

$$\angle H = \cos^{-1}\left(\frac{8.5}{15.6}\right)$$

$$\boxed{\angle H = 57.0^\circ}$$



c) A rope holds a tent. The angle of elevation of the rope is  $59^\circ$ . The rope is attached to the tent at a point 1.2 m above the ground. How high is the tent?



$$\tan 59^\circ = \frac{BC}{1.2}$$

$$BC = \tan 59^\circ \cdot 1.2$$

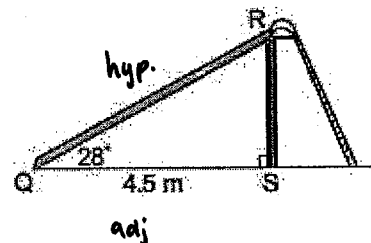
$$\boxed{BC = 2.0 \text{ m}}$$

d) A slide forms an angle of  $28^\circ$ . How long is the slide angle de  $28^\circ$ . ?

$$\cos 28^\circ = \frac{4.5}{QR}$$

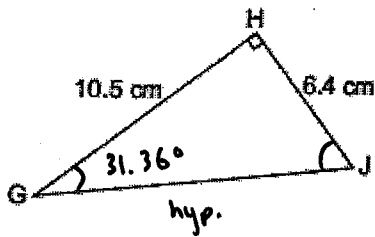
$$QR = \frac{4.5}{\cos 28^\circ}$$

$$\boxed{QR = 5.1 \text{ m}}$$



4. Solve each triangle. (If necessary, indicate measurements to the nearest tenth)

a)



$$(GJ)^2 = 6.4^2 + 10.5^2$$

$$\sqrt{GJ^2} = \sqrt{151.21}$$

$$\boxed{GJ = 12.297}$$

$$\angle G = \tan^{-1}\left(\frac{6.4}{10.5}\right)$$

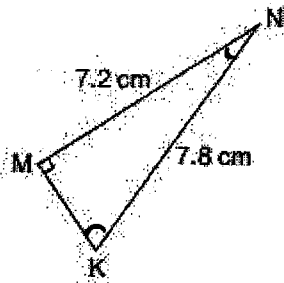
$$\boxed{\angle G = 31.36^\circ}$$

$$\angle J = \tan^{-1}\left(\frac{10.5}{6.4}\right)$$

$$\boxed{\angle J = 58.64^\circ}$$

side GJ	<u>12.3 cm</u>
$\angle G$	<u>31.4°</u>
$\angle J$	<u>58.6°</u>

b)



$$(7.8)^2 = (7.2)^2 + (KM)^2$$

$$60.84 = 51.84 + (KM)^2$$

$$9 = (KM)^2$$

$$\boxed{3 = KM}$$

$$\angle K = \sin^{-1}\left(\frac{7.2}{7.8}\right)$$

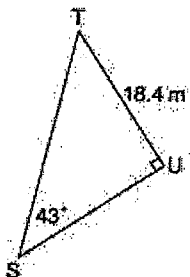
$$\boxed{\angle K = 67.38^\circ}$$

$$\angle N = \cos^{-1}\left(\frac{7.2}{7.8}\right)$$

$$\boxed{\angle N = 22.62^\circ}$$

side KM	<u>3.0 cm</u>
$\angle K$	<u>67.4°</u>
$\angle N$	<u>22.6°</u>

c)



$$\angle T = 180^\circ - 43^\circ - 90^\circ$$

$$\boxed{\angle T = 47^\circ}$$

$$ST: \sin 43^\circ = \frac{18.4}{ST}$$

$$ST = \frac{18.4}{\sin 43^\circ}$$

$$ST = 26.9795$$

$$\boxed{ST = 27.0}$$

$$SU: \tan 43^\circ = \frac{18.4}{SU}$$

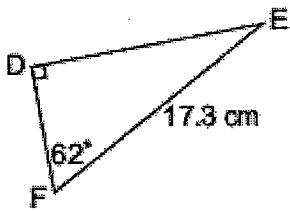
$$SU = \frac{18.4}{\tan 43^\circ}$$

$$SU = 19.732$$

$$\boxed{SU = 19.7}$$

side ST	<u>27.0 m</u>
side SU	<u>19.7 m</u>
$\angle T$	<u>47°</u>

d)



$$\angle E = 180 - 62 - 90$$

$$\boxed{\angle E = 23^\circ}$$

$$DE: \sin 62^\circ = \frac{17.3}{DE}$$

$$DE = \frac{17.3}{\sin 62^\circ}$$

$$\boxed{DE = 15.27}$$

$$DF: \cos 62^\circ = \frac{DF}{17.3}$$

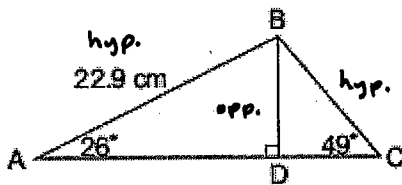
$$DF = \cos 62^\circ \cdot 17.3$$

$$\boxed{DF = 8.12}$$

side DE	15.3 cm
side DF	8.12 cm
$\angle E$	23°

5. Determine the measurement of the side or angle indicate.

a) side BC



$\triangle ABD$

$$\sin 26^\circ = \frac{BD}{22.9}$$

$$BD = 22.9 \cdot \sin 26^\circ$$

$$BD = 10.0 \text{ cm}$$

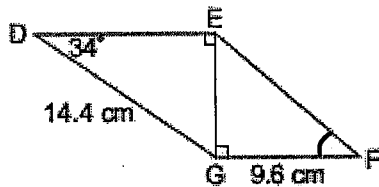
$\triangle BCD$

$$\sin 49^\circ = \frac{10}{BC}$$

$$BC = \frac{10}{\sin 49^\circ}$$

$$\boxed{BC = 13.3 \text{ cm}}$$

b)  $\angle F$



$\triangle DEG$

$$\sin 34^\circ = \frac{EG}{14.4}$$

$$EG = \sin 34^\circ \cdot 14.4$$

$$EG = 8.05 \text{ cm}$$

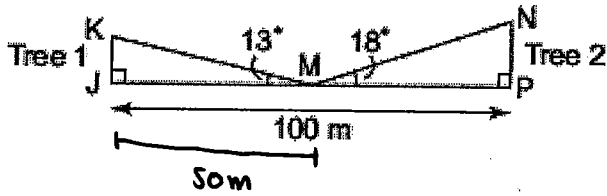
$\triangle EFG$

$$\angle F = \tan^{-1} \left( \frac{EG}{FG} \right)$$

$$\angle F = \tan^{-1} \left( \frac{8.05}{9.6} \right)$$

$$\boxed{\angle F = 40^\circ}$$

6. A distance of 100 m separates two trees. From a point halfway between the two trees, someone measures the elevation angle of the top of each tree. What is the difference between tree heights?



$$JK: \tan 13^\circ = \frac{JK}{50}$$

$$JK = \tan 13^\circ \cdot 50$$

$$JK = 11.54 \text{ m}$$

$$NP: \tan 18^\circ = \frac{NP}{50}$$

$$NP = \tan 18^\circ \cdot 50$$

$$NP = 16.25 \text{ m}$$

$$NP - JK = 16.25 - 11.54$$

$$= \boxed{4.7 \text{ m}}$$

7. The angle of elevation to the tree,  $T$ , is  $27^\circ$ . The angle of elevation to the hawk,  $H$ , is  $43^\circ$ . The tree is 12.7 m tall. Determine the height of the hawk to the nearest tenth of a meter.

$\triangle GQT$

$$\tan 27^\circ = \frac{2.7}{QG}$$

$$QG = \frac{2.7}{\tan 27^\circ}$$

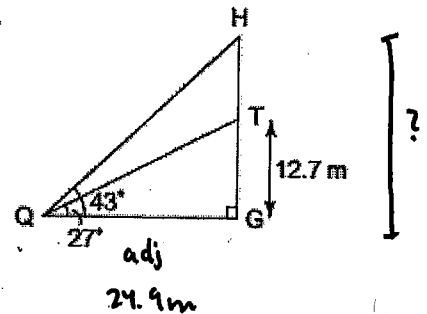
$$QG = 24.9 \text{ m}$$

$\triangle GQH$

$$\tan 43^\circ = \frac{HG}{24.9}$$

$$HG = \tan 43^\circ \cdot 24.9$$

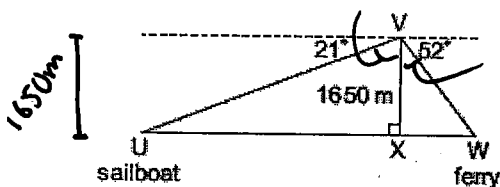
$$\boxed{HG = 23.2 \text{ m}}$$



8. From the aircraft, the angle of depression to a sailboat,  $U$ , is  $21^\circ$ . The angle of depression to a ferry,  $W$ , is  $52^\circ$ . The altitude of the aircraft,  $V$ , is 1650 m. How far apart are the boats, to the nearest metre?

$$90^\circ - 21^\circ = 69^\circ$$

$$90^\circ - 52^\circ = 38^\circ$$



$\triangle VUX$

$$\tan 69^\circ = \frac{UX}{1650}$$

$$UX = \tan 69^\circ \cdot 1650$$

$$UX = 4299.4 \text{ m}$$

$\triangle VWX$

$$\tan 38^\circ = \frac{WX}{1650}$$

$$WX = \tan 38^\circ \cdot 1650$$

$$WX = 1289.1 \text{ m}$$

$$UW = UX + WX$$

$$= 4299.4 + 1289.1$$

$$= 5588.5$$

$$= \boxed{5588 \text{ m}}$$