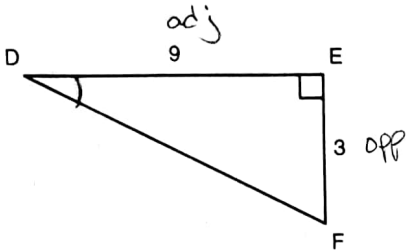


Chapter 2 Trigonometry

Name _____

1. Determine the measure of $\angle D$ to the nearest tenth of a degree.



$$\tan D = \frac{\text{opp}}{\text{adj}}$$

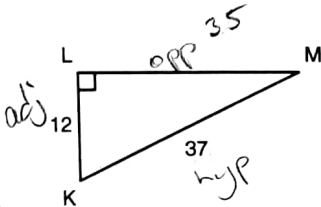
$$\tan D = \frac{3}{9}$$

$$D = \tan^{-1}\left(\frac{3}{9}\right)$$

$$D = 18.4^\circ$$

- a. 18.4° b. 70.5° c. 19.5° d. 71.6°

2. Determine the tangent ratio for $\angle K$.



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

$$c^2 - a^2 = b^2$$

$$37^2 - 12^2 = b^2$$

$$\sqrt{1225} = \sqrt{b^2}$$

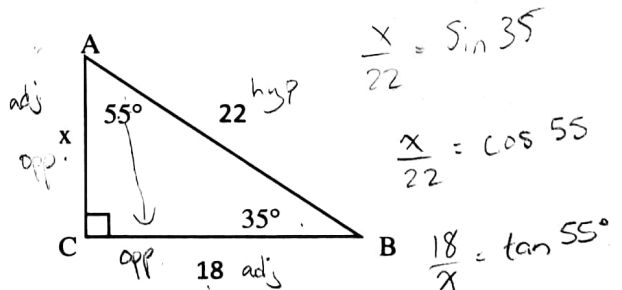
$$b = 35$$

- a. $\frac{12}{37}$ b. $\frac{35}{12}$ c. $\frac{37}{12}$ d. $\frac{12}{35}$

3. Given the triangle at right, which of the expressions below would **not** give the correct length for the indicated side.

- a) $\sqrt{22^2 - 18^2}$ ✓
 c) $22\sin(35^\circ)$ ✓

- b) $22\cos(55^\circ)$ ✓
 d) $18\tan(55^\circ)$ ✗



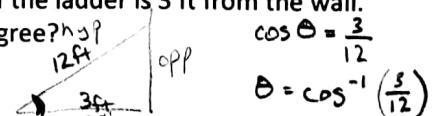
$$\frac{x}{22} = \sin 35^\circ$$

$$\frac{x}{22} = \cos 55^\circ$$

$$\frac{18}{x} = \tan 55^\circ$$

4. A 12 ft ladder is leaned against the side of a house on level ground. The base of the ladder is 3 ft from the wall. What is the angle between the ladder and the ground to the nearest tenth of a degree?

- a) 11.6° b) 14.5° c) 43.6° d) 75.5°

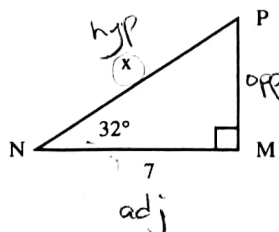


$$\cos \theta = \frac{3}{12}$$

$$\theta = \cos^{-1}\left(\frac{3}{12}\right)$$

5. Given the triangle at right, determine the length of the indicated side to the nearest tenth of a unit.

- a) 8.3 b) 5.9
 c) 13.2 d) 11.2



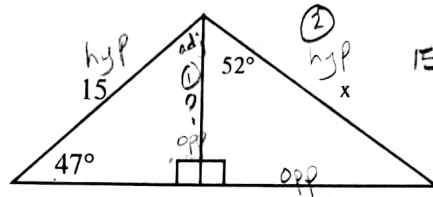
$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 32^\circ = \frac{7}{x}$$

$$x = \frac{7}{\cos 32^\circ}$$

6. Given the diagram at right, determine the length of the indicated side to the nearest tenth of a unit.

- a) 23.8
 b) 18.7
 c) 17.8
 d) 27.4



step 1 $\sin 47^\circ = \frac{15}{x}$

$15 \sin 47^\circ = 15 \cdot 0.7314$
 $10.9703 = 15$

step 2 $\cos 52^\circ = \frac{10.9703}{x}$

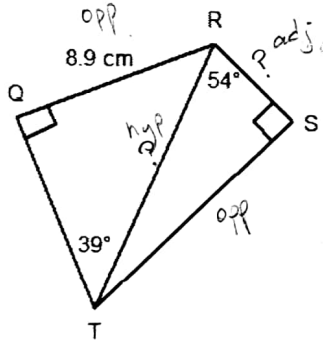
$x = \frac{10.9703}{\cos 52^\circ}$

7. A road in the Cape Breton highlands has a 13% grade, meaning that for every 100 m of horizontal displacement there is a 13 m vertical displacement. How many kilometres would a vehicle have driven along this road if at a certain point the vertical displacement driven was 272 m?

- a) 2.888 km
 b) 35.032 km
 c) 2.743 km
 d) 2.112 km
 Ans = 2.1 km



8. Determine the length of RS to the nearest tenth of a centimetre.



$\sin 39^\circ = \frac{8.9}{\text{hyp}}$

$\text{hyp} = \frac{8.9}{\sin 39^\circ}$
 $\text{hyp} = 14.1422 \text{ cm}$

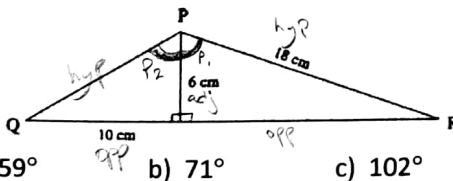
$\cos 54^\circ = \frac{\text{adj}}{\text{hyp}}$

$\cos 54^\circ = \frac{\text{adj}}{14.1422}$

$14.1422 \cos 54^\circ = \text{adj}$

- a) 9.3 cm
 b) 6.7 cm
 c) 11.4 cm
 d) 8.3 cm

9. Determine the measure of $\angle QPR$.



- a) 59 degrees
 b) 71 degrees
 c) 102 degrees
 d) 130 degrees

$\cos P_1 = \frac{\text{adj}}{\text{hyp}} = \frac{6}{18}$

$P_1 = \cos^{-1}(\frac{6}{18})$
 $P_1 = 70.5288^\circ$

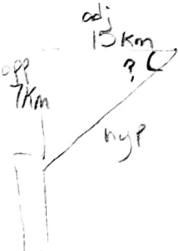
$\tan P_2 = \frac{\text{opp}}{\text{adj}} = \frac{10}{6}$

$P_2 = \tan^{-1}(\frac{10}{6}) = 59.0362^\circ$

add

10. A water taxi leaves its dock, and travels 7 km due north to pick up medical supplies. It then travels 15 km due east to drop off the supplies at a hospital. To the nearest degree, what is the measure of the angle between the path it took due east and the path it will take to return directly to its dock?

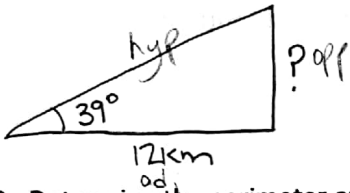
- a) 65 degrees
 b) 28 degrees
 c) 62 degrees
 d) 25 degrees



$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{7}{15}$

$\theta = \tan^{-1}(\frac{7}{15})$

1. A plane climbs at an angle of 39° through a distance of 12 km. What altitude (vertical height), rounded to the nearest tenth of a km, does it reach? Draw a labelled diagram and solve.

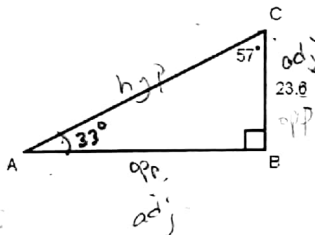


$$\tan 39^\circ = \frac{\text{opp}}{12}$$

$$12 \tan 39^\circ = \text{opp}$$

9.7 km \rightarrow altitude of plane

2. Determine the perimeter of $\triangle ABC$ to the nearest metre.



$$\tan 57^\circ = \frac{\text{opp}}{\text{adj}}$$

$$\tan 57^\circ = \frac{\text{opp}}{23.6}$$

$$23.6 \tan 57^\circ = \text{opp}$$

$$\text{opp} = 36.3408$$

$$\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{23.6}{\text{hyp}}$$

$$\text{hyp} = \frac{23.6}{\sin 33^\circ} \quad \text{hyp} = 43.3315$$

$$P = 23.6 + 36.3408 + 43.3315$$

$$P = 103 \text{ m}$$

3. Calculate the measure of $\angle GHJ$ to the nearest tenth of a degree.

$$c^2 - a^2 = b^2$$

$$9^2 - 6^2 = b^2$$

$$\sqrt{45} = \sqrt{b^2}$$

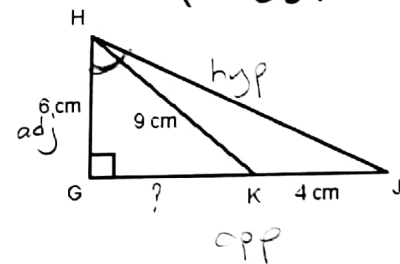
$$6.7082 = b$$

$$4 + 6.7082 = GJ$$

$$10.7082 = GJ$$

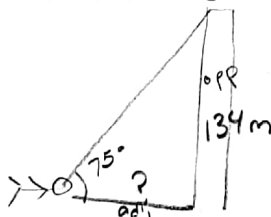
$$\tan H = \frac{\text{opp}}{\text{adj}}$$

$$\tan H = \frac{10.7082}{6}$$



$$H = \tan^{-1}\left(\frac{10.7082}{6}\right) \quad H = 60.7^\circ$$

4. The height of the Telus Plaza South in Edmonton is about 134 m. Stacy is lying on the ground near the building. The angle between the ground and her line of sight to the top of the building is 75° . About how far is Stacy from the base of the building, to the nearest metre?

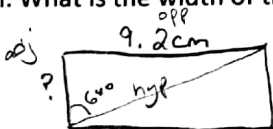


$$\tan 75^\circ = \frac{134}{\text{adj}}$$

$$\text{adj} = \frac{134}{\tan 75^\circ}$$

$$\text{adj} = 35.9 \text{ m}$$

5. The angle between one shorter side of a rectangle and a diagonal is 64° . One longer side of the rectangle is 9.2 cm. What is the width of the rectangle, to the nearest tenth of a centimetre?



$$\tan 64^\circ = \frac{9.2}{\text{adj}}$$

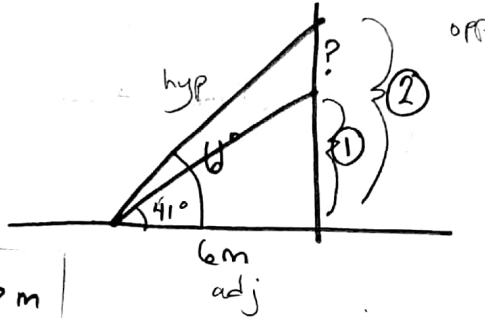
$$\text{adj} = \frac{9.2}{\tan 64^\circ}$$

$$\text{adj} = 4.5 \text{ cm}$$

6. Francis wants to know the distance between the points where two guy wires are attached to a pole. The guy wires are anchored to the ground at the same point, 6.0 m from the base of the pole. The angle of inclination of the longer wire is 61° and the angle of inclination of the shorter wire is 41° . To the nearest tenth of a metre, how far apart are the points where the guy wires are attached to the pole?

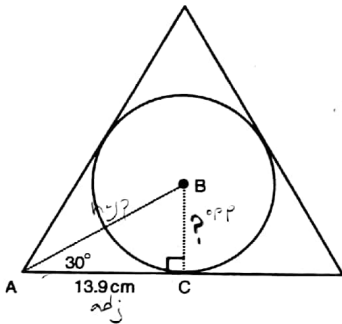
② $\tan 61^\circ = \frac{\text{opp}}{6}$ $\text{opp} = 10.8243 \text{ m}$

① $\tan 41^\circ = \frac{\text{opp}}{6}$ $\text{opp} = 5.2157 \text{ m}$



$10.8243 - 5.2157 = 5.6 \text{ m}$

7. Calculate the area, to the nearest tenth of a square centimetre, of the circle inscribed in the equilateral triangle below.



$\tan 30^\circ = \frac{\text{opp}}{13.9}$

opp is radius of circle

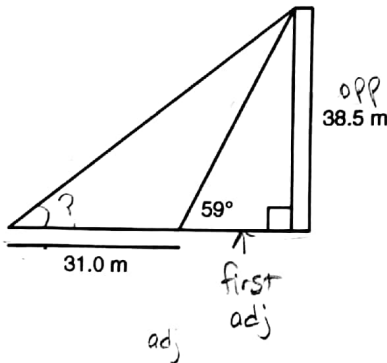
$13.9 \tan 30^\circ = \text{opp}$

$8.0252 \text{ cm} = \text{opp}$

$A = \pi r^2$
 $= \pi (8.0252)^2$
 $= 202.331 \text{ cm}^2$

$= 202.3 \text{ cm}^2$

8. A Girl Guide measured the angle of elevation of the top of a monument as 59° . The height of the monument is 38.5 m. She then walked 31.0 m due west from the point where she measured the angle of elevation. Determine the angle of elevation of the monument from her new location to the nearest tenth of a degree.



$\tan 59^\circ = \frac{38.5}{\text{adj}}$

$\text{adj} = \frac{38.5}{\tan 59^\circ} = 23.1331$

$31 \text{ m} + 23.1331 \text{ m} = 54.1331 \text{ m}$

$\tan ? = \frac{\text{opp}}{\text{adj}} = \frac{38.5}{54.1331}$

$? = \tan^{-1} \left(\frac{38.5}{54.1331} \right)$

$? = 35.4^\circ$