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LABELLING TRIANGLES


THE THREE PRIMARY TRIG RATIOS
The three primary trigonometric ratios are:


1. Determine the following ratios for the given right triangle.
a. $\cos A=\frac{A}{H}$

$$
\begin{aligned}
& =\frac{6}{10} \\
& =3 / 5
\end{aligned}
$$

b. $\tan C=\frac{O}{A}$

$$
\begin{aligned}
& =\frac{6}{8} \\
& =3 / 4
\end{aligned}
$$


2. Using your calculator, determine each trigonometric ratio to FOUR decimal places.
a. $\cos 32^{\circ}=\underline{0.8480}$
b. $\tan 75^{\circ}=3.7321$
c. $\sin 25^{\circ} \doteq 0.4226$
3. Determine the length of $x$ in each triangle.

4. Solve the triangle. (Solve in this context means to find out every unknown: sides and angles.)


$$
\begin{aligned}
& \frac{\operatorname{solving} \text { for } q}{\frac{\sin 57}{1}=\frac{35}{9} \cdot \text { flifeach }} \text { side } \\
& 35 \cdot \frac{1}{\sin 57}=\frac{q}{35}-35 \\
& 41.7=q
\end{aligned}
$$

$$
\begin{aligned}
p^{2} & =(41.7)^{2}-(35)^{2} \\
\sqrt{p^{2}} & =513.89 \\
p & =22.7
\end{aligned}
$$

Solving for $\alpha$

$$
\begin{aligned}
& \alpha=180-90-57 \\
& \alpha=33^{\circ}
\end{aligned}
$$



## Angle of Elevation \& Depression

## Terminology:



Ex1. A plane is coming down for a landing at YYZ. The angle of depression is $22^{\circ}$. The plane is 350 m from the ground. Determine the distance from the plane to the airport.


Ex. A carpenter leans a ladder against a wall at an angle of $68^{\circ}$. The distance from the foot of the ladder to the wall is 36 inches. Draw a diagram with the given information.
a. How long is the ladder?
b. How high up is the ladder?


$$
\text { b) } h \underset{68 \lambda}{ } \tan 68=\frac{h}{36} h
$$

inches high up from the 3 or mu p
$\therefore$ The ladder is 96.1 incheslong and 89.1 inches high up page 3 of 4 u

DETERMINING ANGLES USING TRIG RATIOS

1. Determine the measure of each angle to the nearest degree.

2. Calculate the measure of $\angle A$ to the nearest degree.

$$
\begin{aligned}
\tan \theta & =\frac{D}{A} \\
\tan \theta & =\frac{7}{4} \\
\tan ^{-1}(7 / 4) & =\theta \\
\theta & =60
\end{aligned}
$$

$$
\therefore \text { It's } 60^{\circ} \text {. }
$$


3. Solve the triangle. (ROUNDING: Angles nearest degree, Sides one decimal place)

$$
\begin{aligned}
& \cos \theta=\frac{13.2}{28.4} \begin{array}{l}
\frac{\alpha=180-90-62}{\alpha-281} \\
\cos ^{-1}\left(\frac{13.2}{28.4}\right)=\theta \\
\theta=62^{\circ}
\end{array} \\
& \begin{array}{l}
r^{2}=(28.4)^{2}-(13.2)^{2} \\
r^{2}=632.32
\end{array} \\
& \quad \begin{aligned}
r=25.1
\end{aligned} R \text { is } 28^{\circ}, \theta \text { is } 62^{\circ} \text { and } r \text { is } 25.1 \mathrm{~cm} .
\end{aligned}
$$

4. Suppose a tree 50 feet in height casts a shadow of length 60 feet. What is the angle of elevation from the end of the shadow to the top of the tree with respect to the ground?

$\therefore$ The angle of elevation is $40^{\circ}$.
