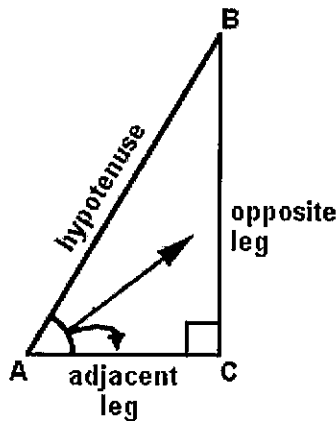


## Trigonometry - "triangle measurement"

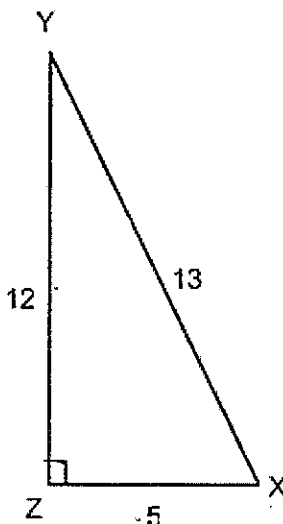
**Tangent Ratio:**

$$\text{tangent of } \angle A = \frac{\text{leg opposite } \angle A}{\text{leg adjacent to } \angle A} \quad \text{Or } \tan A = \frac{\text{opposite}}{\text{adjacent}}$$

- Value of the tangent of an angle depends only on the size of the angle, not on the size of the right triangle.
- If  $\tan A = \tan B$  for acute angles A & B, then  $m\angle A = m\angle B$
- You can find the tangent of an angle by using a table (page 311) or your calculator
- You can find the approximate degree measure of an angle with a given tangent by reading the table or using the inverse tangent key on your calculator

## Examples:

- a. Find  $\tan X$  and  $\tan Y$ ,  $m\angle X = m\angle Y$



$$\tan X = \frac{12}{5} = 2.4 \rightarrow m\angle X \approx 67.4^\circ$$

$$\tan Y = \frac{5}{12} = 0.41\bar{6} \rightarrow m\angle Y \approx \underline{\underline{22.6^\circ}}$$

90

$$* \frac{12}{5} = 2.4 \rightarrow \text{This is the tangent of } \angle X$$

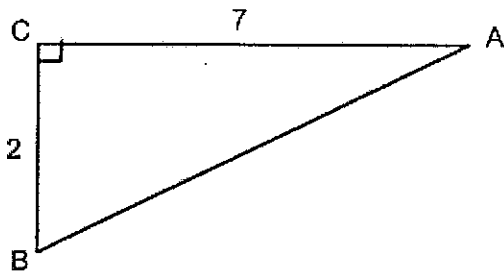
$$* \tan^{-1}(2.4) \approx 67.4 \rightarrow \text{This is } m\angle X \text{ if } \angle X \text{ has tangent} = 2.4$$

(inverse TANGENT)

$$* \frac{5}{12} = 0.41\bar{6} \rightarrow \text{This is tangent of } \angle Y$$

$$* \tan^{-1}(0.41\bar{6}) \approx 22.6 \rightarrow \text{This must be } m\angle Y$$

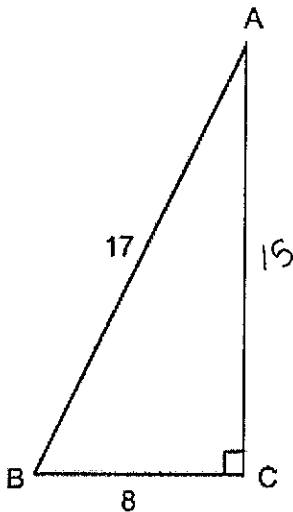
- b. Find  $\tan A$  and  $\tan B$ ,  $m\angle A = m\angle B$



$$\tan A = \frac{2}{7} \approx 0.286 \rightarrow m\angle A \approx 15.9^\circ$$

$$\tan B = \frac{7}{2} \approx 3.5 \rightarrow m\angle B \approx 74.1^\circ$$

- c. Find  $\tan A$  and  $\tan B$ ,  $m\angle A = m\angle B$



$$8^2 + (AC)^2 = 17^2$$

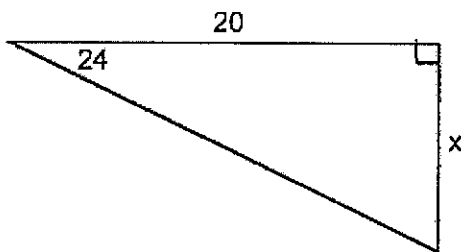
$$\sqrt{AC^2} = \sqrt{225}$$

$$AC = 15$$

$$\tan A = \frac{8}{15} \approx 0.53 \rightarrow m\angle A \approx 28.1^\circ$$

$$\tan B = \frac{15}{8} \approx 1.875 \rightarrow m\angle B \approx 61.9^\circ$$

- d. Find the value of X to the nearest tenth.

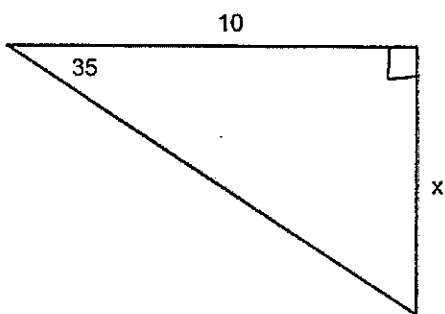


$$\tan 24 \approx 0.445$$

$$0.445 \approx \frac{x}{20}$$

$$8.9 \approx x$$

- e. Find the value of X to the nearest tenth.

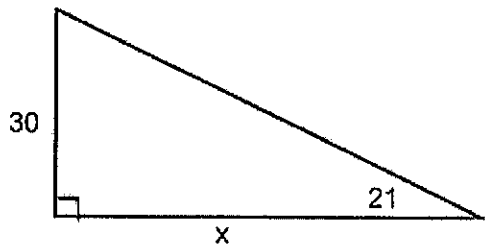


$$\tan 35 \approx 0.7$$

$$0.7 = \frac{x}{10}$$

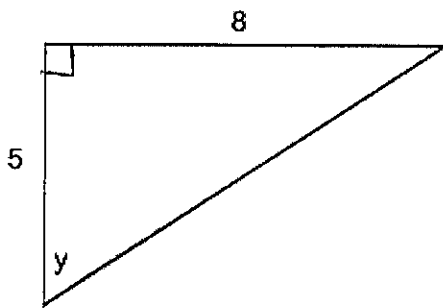
$$7 \approx x$$

- f. Find the value of X to the nearest tenth.



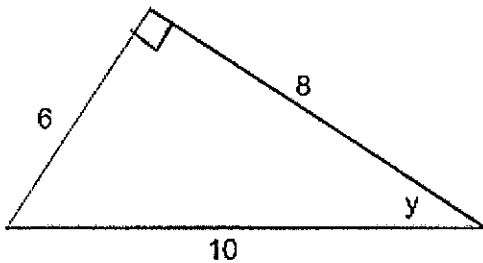
$$\begin{aligned}\tan 21 &\approx \frac{30}{x} \\ 0.384 &\approx \frac{30}{x} \\ 78 &\approx x\end{aligned}$$

- g. Find  $y^\circ$  correct to the nearest degree.



$$\begin{aligned}\tan y &= \frac{8}{5} \approx 1.6 \\ m\angle y &\approx 58^\circ\end{aligned}$$

- h. Find  $y^\circ$  correct to the nearest degree.



$$\begin{aligned}\tan y &= \frac{6}{8} \approx 0.75 \\ m\angle y &\approx 37^\circ\end{aligned}$$