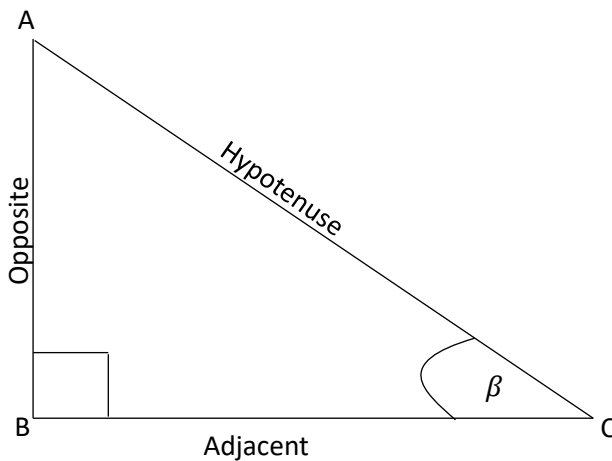


SHARP

Trigonometry Identities - Memo

Grade 11 Maths

1. Draw a right-angled triangle.



$$(\text{Hypotenuse})^2 = (\text{Opposite})^2 + (\text{Adjacent})^2$$

$$\sin\beta = \frac{\text{Opp}}{\text{Hyp}}$$

$$\text{Opp} = \text{Hyp} \times \sin\beta \dots (1)$$

$$\cos\beta = \frac{\text{Adj}}{\text{Hyp}}$$

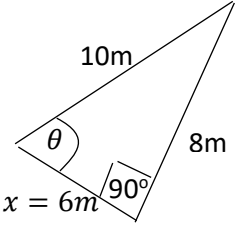
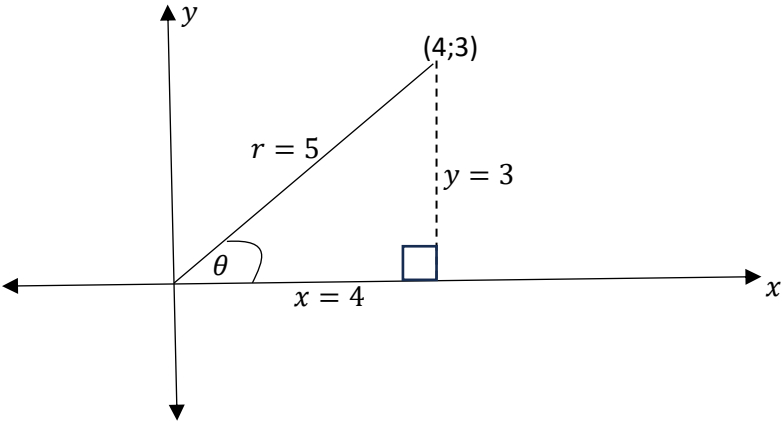
$$\text{Adj} = \text{Hyp} \times \cos\beta \dots (2)$$

$$(\text{Hyp})^2 = (\text{Hyp} \times \sin\beta)^2 + (\text{Hyp} \times \cos\beta)^2$$

$$(\text{Hyp})^2 = (\text{Hyp})^2 [\sin^2\beta + \cos^2\beta]$$

$$\therefore \sin^2\beta + \cos^2\beta = 1$$

2. Complete the following table without using a calculator. Leave your answers in surd form where applicable.

	$\theta = 45^\circ$	 <p>$(10m)^2 - (8m)^2 = (x)^2$ $\therefore x = \pm 6m$</p>	 <p>$(r)^2 = (4)^2 + (3)^2$ $\therefore r = 5$</p>
$\sin\theta$	$\frac{\sqrt{2}}{2}$	$\frac{8m}{10m} = \frac{8}{10}$	$\frac{3}{5}$
$\cos\theta$	$\frac{\sqrt{2}}{2}$	$\frac{6m}{10m} = \frac{6}{10}$	$\frac{4}{5}$
$\frac{\sin\theta}{\cos\theta}$	1	$\frac{8m}{6m} = \frac{8}{6}$	$\frac{3}{4}$
$\tan\theta$	1	$\frac{8m}{6m} = \frac{8}{6}$	$\frac{3}{4}$

- Examine the last two rows of the table and make a conjecture.

In the last two rows of the table all columns are equal.

- Are there any values of θ which your conjecture will not be true?
 Explain your answer.

Yes, when $\theta = 90^\circ$ $\tan \theta$ is undefined.

3. Complete the table below with the use of a calculator. Leave your answers in surd form where applicable.

θ	0°	30°	45°	60°	90°
$\frac{\sin\theta}{\cos\theta}$	0	$\frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	Undefined
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	Undefined

- What do you notice in your answers where θ is 90° ?

$\frac{\sin\theta}{\cos\theta}$ and $\tan\theta$ are undefined.

- What can you conclude about that? And why?

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ except when $\theta = 90^\circ \times k$, where $k \in$ odd integers. Because this identity will be undefined.
