Trigonometric Ratios Ex 5.1 Q1

Answer :

(i) Given: $\sin A = \frac{2}{3}$ ......(1)

By definition,

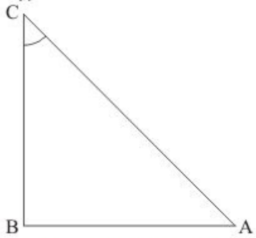
$\sin A = \frac{\text{Perpendiular}}{\text{Hypotenuse}}$ ...... (2)

By Comparing (1) and (2)

We get,

Perpendicular side = 2 and

Hypotenuse = 3



Therefore, by Pythagoras theorem,

$AC^2 = AB^2 + BC^2$

Now we substitute the value of perpendicular side (BC) and hypotenuse (AC) and get the base side (AB)

Therefore,

$$3^2 = AB^2 + 2^2$$

$$AB^2 = 3^2 - 2^2$$

$$AB^2 = 9 - 4$$

$$AB^2 = 5$$

$$AB = \sqrt{5}$$

Hence, Base = $\sqrt{5}$

Now, $\cos A = \frac{\text{Base}}{\text{Hypotenuse}}$

$$\cos A = \frac{\sqrt{5}}{}$$

3

Now, $\operatorname{cosec} A = \frac{1}{\sin A}$

Therefore,

$$\operatorname{cosec} A = \frac{\text{Hypotenuse}}{\text{Perpendicular}}$$

$$\operatorname{cosec} A = \frac{3}{2}$$

Now, $\sec A = \frac{\text{Hypotenuse}}{\text{Base}}$

Therefore,

$$\sec A = \frac{3}{\sqrt{5}}$$

Now, $\tan A = \dfrac{\text{Perpendicular}}{\text{Base}}$

Therefore,

$$\tan A = \frac{2}{\sqrt{5}}$$

Now, $\cot A = \dfrac{\text{Base}}{\text{Perpendicular}}$

Therefore,

$$\cot A = \frac{\sqrt{5}}{2}$$

(ii) Given: $\cos A = \dfrac{4}{5}$ ......(1)

By definition,

$$\cos A = \frac{\text{Base}}{\text{Hypotenuse}} \quad \text{...... (2)}$$

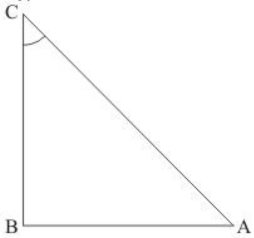
By Comparing (1) and (2)

We get,

Base = 4 and

Hypotenuse = 5

Hypotenuse = 5



Therefore,

By Pythagoras theorem,

$$AC^2 = AB^2 + BC^2$$

Now we substitute the value of base side (*AB*) and hypotenuse (*AC*) and get the perpendicular side (*BC*)

$$5^2 = 4^2 + BC^2$$
$$BC^2 = 5^2 - 4^2$$
$$BC^2 = 25 - 16$$
$$BC^2 = 9$$
$$BC = 3$$

Hence, Perpendicular side = 3

Now, $\sin A = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$

Therefore,

$$\sin A = \frac{3}{5}$$

Now, $\operatorname{cosec} A = \dfrac{1}{\sin A}$

Therefore,

$$\therefore \operatorname{cosec} A = \frac{\text{Hypotenuse}}{\text{Perpendicular}}$$

$$\operatorname{cosec} A = \frac{5}{3}$$

Now, $\sec A = \dfrac{1}{\cos A}$

Therefore,

$$\sec A = \frac{\text{Hypotenuse}}{\text{Base}}$$

$$\sec A = \frac{5}{4}$$

Now, $\tan A = \dfrac{\text{Perpendicular}}{\text{Base}}$

Therefore,

$$\tan A = \frac{3}{4}$$

*********** END **********