REVIEW EXERCISE

Four options are given against each statement. Encircle the correct one.

(i) **T**

he value of $\tan^{-1} 2$ **in radians is:**

(a) $\frac{\pi}{2}$ (b) $\frac{3\pi}{2}$

(c) 0.4636π (d) 0.4636

(ii) **I**

n a right triangle, the hypotenuse is 13 units and one of the angles is $\theta = 30°$**. The length of the opposite side is:**

(a) 6.5 units (b) 7.5 units

(c) 6 units (d) 5 units

(iii) **A**

person standing 50 m away from a building sees the top of the building at an angle of elevation of 45°. Height of the building is:

(a) 50 m (b) 25 m

(c) 35 m (d) 70 m

(iv) $\sec^2\theta - \tan^2\theta =$ _____

(a) $\sin^2\theta$ (b) 1

(c) $\cos^2\theta$ (d) $\cot^2\theta$

(v) **I**

f $\sin\theta = \frac{3}{5}$ **and** θ **is an acute angle,** $\cos^2\theta =$ _____

(a) $\frac{7}{25}$ (b) $\frac{24}{25}$

(c) $\frac{16}{25}$ (d) $\frac{4}{25}$

(vi) $\frac{5\pi}{24} rad =$ _____ **degrees.**

(a) 30° (b) 37.5°

(c) 45° (d) 52.5°

(vii) $292.5° =$ _____ **rad.**

(a) $\frac{17\pi}{6}$ (b) $\frac{17\pi}{4}$

(c) 1.6π (d) 1.625π

(viii) **W**

hich of the following is a valid identity?

(a) $\cos\left(\frac{\pi}{2} - \theta\right) = \sin\theta$

(b) $\cos\left(\frac{\pi}{2} - \theta\right) = \cos\theta$

(c) $\cos\left(\frac{\pi}{2} - \theta\right) = \sec\theta$

(d) $\cos\left(\frac{\pi}{2}-\theta\right)=\operatorname{cosec}\theta$

(ix) $\sin 60°=$

(a) 1 (b) $\frac{1}{2}$

(c) $\sqrt{(3)^2}$ (d) $\frac{\sqrt{3}}{2}$

(x) $\cos^2 100\pi+\sin^2$

(a) 1 (b) 2

(c) 3 (d) 4

Answer Key

1	d	**2**	a	**3**	a	**4**	b	**5**	c
6	b	**7**	d	**8**	a	**9**	d	**10**	a

Q.1 **C**

onvert the given angles from:

(a) Degrees to radians giving answer in terms of π .

(i) $255°$

Ans:

$$1=\frac{\pi}{180}$$

$$225°\times 1=225\times\frac{\pi}{180}=$$

(ii) $75°45'$

Ans:

$$1=\frac{\pi}{180}$$

$75°45'$

$$75°45'=75°45'\frac{\pi}{180}$$

$$=75°+\left(\frac{45}{60}\right)°\frac{\pi}{180}$$

(iii) $142.5°$

Ans:

$$1=\frac{\pi}{180}$$

$$142.5°\times 1=142.5°\times\frac{\pi}{180}$$

(b) **Radians to degrees giving answer in degrees and minutes**

(i) $\frac{17\pi}{24}$

Ans:

$$\frac{17\pi}{24}=\frac{17\pi}{24}\times\frac{180}{\pi}$$

$$=127.5°=127°+0.5°$$

$=125^\circ+(0.5\times 60)'=125^\circ 30'$

(ii) $\frac{7\pi}{12}$

Ans:

$\frac{7\pi}{12}=\frac{7\pi}{12}\times\frac{180}{\pi}$

$=105^\circ$

(iii) $\frac{11\pi}{16}$

Ans:

$\frac{11\pi}{16}=\frac{11\pi}{16}\times\frac{180}{\pi}$

$=123.75^\circ$

$=123^\circ+75^\circ$

$=125^\circ+(0.75\times 60)'$

$=125^\circ 45'$

Q.2 **P**

rove the following trigonometric identities.

(i) $\frac{\sin\theta}{1-\cos\theta}=\frac{1+\cos\theta}{\sin\theta}$

Ans:

L.H.S

$\frac{\sin\theta}{1-\cos\theta}$

Multiplying and dividing by $1+\cos\theta$

$=\frac{\sin\theta}{1-\cos\theta}\times\frac{1+\cos\theta}{1+\cos\theta}$

$=\frac{\sin\theta(1+\cos\theta)}{1-\cos^2\theta}=\frac{\sin\theta(1+\cos\theta)}{\sin^2\theta}$

$=\frac{\sin\theta(1+\cos\theta)}{\sin\theta\times\sin\theta}$

$=\frac{1+\cos\theta}{\sin\theta}$

(ii) $\sin\theta(\operatorname{cosec}\theta-\sin\theta)=\frac{1}{\sec^2\theta}$

Ans:

L.H.S

$\sin\theta(\operatorname{cosec}\theta-\sin\theta)$

$=\sin\theta=\sin\left[\frac{1}{\sin\theta}-\sin\theta\right]$

$=\sin\theta\left[\frac{1-\sin^2\theta}{\sin\theta}\right]$

$=1-\sin^2\theta=\cos^2\theta$

$$= \frac{1}{\sec^2\theta}$$

(iii) $\dfrac{\operatorname{cosec}\theta - \sec\theta}{\operatorname{cosec}\theta + \sec\theta} = \dfrac{1-\tan\theta}{1+\tan\theta}$

Ans:

$$= \left[\frac{1}{\sin\theta} - \frac{1}{\cos\theta}\right] \div \left[\frac{1}{\sin\theta} + \frac{1}{\cos\theta}\right]$$

$$= \frac{\cos\theta - \sin\theta}{\sin\theta\cos\theta} \div \frac{\cos\theta + \sin\theta}{\sin\theta\cos\theta}$$

$$= \frac{\cos\theta - \sin\theta}{\sin\theta\cos\theta} \times \frac{\sin\theta\cos\theta}{\cos\theta + \sin\theta}$$

$$= \frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}$$

Dividing humenator and denominator by $\cos\theta$

$$= \frac{\frac{\cos\theta}{\cos\theta} - \frac{\sin\theta}{\cos\theta}}{\frac{\cos\theta}{\cos\theta} + \frac{\sin\theta}{\cos\theta}}$$

$$= \frac{1-\tan\theta}{1+\tan\theta}$$

L.H.S = R.H.S

(iv) $\tan\theta + \cot\theta = \dfrac{1}{\sin\theta\cos\theta}$

Ans:

L.H.S

$\tan\theta + \cot\theta$

$$= \frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta} = \frac{\sin^2\theta + \cos^2\theta}{\cos\theta\sin\theta}$$

$$= \frac{1}{\cos\theta\sin\theta}$$

(v) $\dfrac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} + \dfrac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \dfrac{2}{1-2\sin^2\theta}$

Ans:

L.H.S $\cos\theta\left(\tan\theta + \cot\theta\right)$

$$= \cos\theta\left[\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right]$$

$$= \cos\theta\left[\frac{\sin^2\theta + \cos^2\theta}{\cos\theta\sin\theta}\right]$$

$$= \frac{1}{\sin\theta}$$

$$= \operatorname{cosec}\theta$$

(vi) $\dfrac{1+\cos\theta}{1-\cos\theta} = \left(\operatorname{cosec}\theta + \cot\theta\right)^2$

Ans:

L.H.S

$$\frac{\tan\theta + \cot\theta}{\operatorname{cosec}\theta}$$

$$= \left[\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right] \div \operatorname{cosec}\theta$$

$$= \frac{\sin^2\theta + \cos^2\theta}{\cos\theta\sin\theta} \div \frac{1}{\sin\theta}$$

$$= \frac{1}{\cos\theta\sin\theta} \times \sin\theta$$

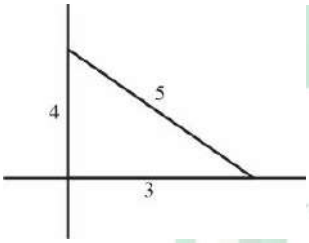
$$= \frac{1}{\cos\theta}$$

$$= \sec\theta$$

L.H.S = R.H.S

Q.3 **I**

f $\tan\theta = \dfrac{3}{\sqrt{2}}$ **then find the remaining trigonometric ratios when** θ **lies in first quadrant.**



Ans:

By pathagorous theorem

$$\left(\text{Hyp}\right)^2 = \left(\text{Prep}\right)^2 + \left(\text{base}\right)^2$$

$$\left(\text{Hyp}\right)^2 = \left(4\right)^2 + \left(3\right)^2$$

$$\left(\text{Hyp}\right)^2 = 16 + 9$$

$$\left(\text{Hyp}\right)^2 = 25$$

$$\sqrt{\left(\text{Hyp}\right)^2} = \sqrt{25}$$

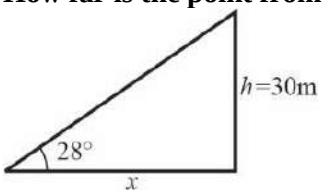
$$\text{Hyp} = 5$$

$\sin\theta = \dfrac{4}{5}$ $\quad \operatorname{cosec}\theta = \dfrac{5}{4}$

$\cos\theta = \dfrac{3}{5}$ $\quad \sec\theta = \dfrac{5}{3}$

$\tan\theta = \dfrac{4}{3}$ $\quad \cot\theta = \dfrac{3}{4}$

Q.4 From a point on the ground, the angle of elevation to the top of a 30 m high building is 28°. How far is the point from the bae of the building?



Ans:

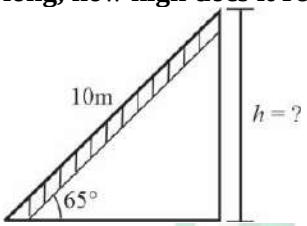
$$\tan\theta = \frac{\text{Prep}}{\text{base}}$$

$$\tan 28 = \frac{30}{x}$$

$$x = \frac{30}{\tan 28}$$

$$x = 56.42m$$

Q.5 A ladder leaning against a wall forms an angle of 65° with the ground. If the ladder is 10 m long, how high does it reach on the wall?



Ans:

$$\sin\theta = \frac{\text{Prep}}{\text{Hyp}}$$

$$\sin 65 = \frac{h}{10}$$

$$10\sin 65 = h$$

$$h = 90.63m$$