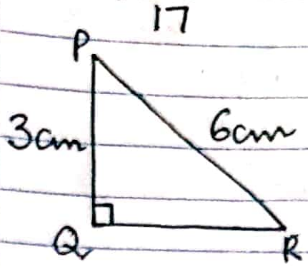
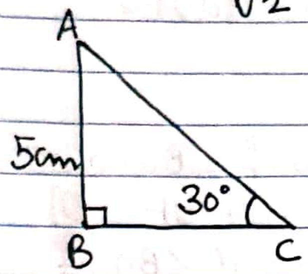
X Elite work – 11 (MCQs – TRIGONOMETRY)

1) If $15 \cot A = 8$, then $\sec A =$
(a) $\frac{8}{17}$ (b) $\frac{17}{8}$ (c) $\frac{15}{8}$ (d) $\frac{8}{15}$

2) 

ΔPQR is right-angled at Q, $PQ = 3cm$, $PR = 6cm$. The value of $\angle QPR - \angle PRQ =$ ___
(a) $15°$ (b) $30°$ (c) $45°$ (d) $10°$

3) If $\sin(A-B) = \frac{1}{2}$; $\cos(A+B) = \frac{1}{2}$, then $\sin(A+B) =$
(a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

4) 

In ΔABC, right angled at B, $AB = 5cm$ and $\angle ACB = 30°$, then $\frac{BC}{AC} =$
(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$ (c) $5\sqrt{3}$ (d) $10cm$

5) If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$, then $\sec(A-B) =$
(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{2}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

6) If A, B and C are interior angles of a ΔABC, then $\sin\left(\frac{B+C}{2}\right) =$
(a) $\operatorname{cosec}\frac{A}{2}$ (b) $\tan\frac{A}{2}$ (c) $\sec\frac{A}{2}$ (d) $\cos\frac{A}{2}$

7) $\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta) =$
(a) 0 (b) ½ (c) 1 (d) none of these

8) $9\sec^2\theta - 9\tan^2\theta =$ (a) 1 (b) 9 (c) 8 (d) 0

9) $(1+\tan\theta+\sec\theta)(1+\cot\theta-\operatorname{cosec}\theta) =$
(a) 0 (b) 1 (c) 2 (d) -1

10) $\frac{1+\tan^2\theta}{1+\cot^2\theta} =$ (a) $\sec^2\theta$ (b) -1 (c) $\cot^2\theta$ (d) $\tan^2\theta$.

X

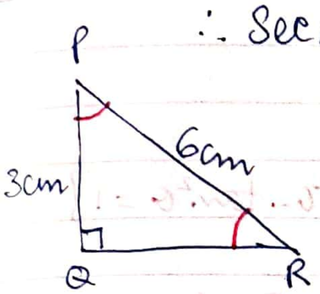
EW-11 (TRIGONOMETRY — Answers)

1) $15 \cot A = 8 \Rightarrow \cot A = \frac{8}{15}$

$\tan A = \frac{15}{8}$

$\sec^2 A = 1 + \tan^2 A = 1 + \frac{225}{64} = \frac{289}{64}$

$\therefore \sec A = \frac{17}{8}$ (b)

2) 

$\cos P = \frac{PQ}{PR} = \frac{3}{6} = \frac{1}{2}$

$\therefore \angle P = 60^\circ$

Then, $\angle R = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$

$\therefore \angle QPR - \angle PRQ = 60^\circ - 30^\circ = 30^\circ$ (b)

3) $\cos(A+B) = \frac{1}{2} \Rightarrow A+B = 60^\circ$

$\therefore \sin(A+B) = \sin 60^\circ = \frac{\sqrt{3}}{2}$ (c)

4) $\tan 30^\circ = \frac{AB}{BC}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{5}{BC} \Rightarrow BC = 5\sqrt{3}$ cm

$\sin 30^\circ = \frac{AB}{AC}$

$\Rightarrow \frac{1}{2} = \frac{5}{AC} \Rightarrow AC = 10$ cm

$\therefore \frac{BC}{AC} = \frac{5\sqrt{3}}{10} = \frac{\sqrt{3}}{2}$ (b)

5) $\tan(A-B) = \frac{1}{\sqrt{3}} \Rightarrow A - B = 30^\circ$

$\therefore \sec(A-B) = \sec 30^\circ = \frac{2}{\sqrt{3}}$ (b)

6) $A+B+C = 180^\circ$ (angle sum property of a $\triangle$)

$\Rightarrow B+C = 180^\circ - A$

$\therefore \frac{B+C}{2} = 90^\circ - \frac{A}{2} \longrightarrow (1)$

$\sin\left(\frac{B+C}{2}\right) = \sin\left(90^\circ - \frac{A}{2}\right) = \cos\frac{A}{2}$ (d) $[\because \sin(90^\circ - \theta) = \cos\theta]$

7) $\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)$

$= \frac{1}{\cos\theta}(1-\sin\theta)\left(\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}\right)$ [$\because \sec\theta = 1/\cos\theta$; $\tan\theta = \sin\theta/\cos\theta$]

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

$= \frac{1-\sin^2\theta}{\cos^2\theta} = \frac{\cos^2\theta}{\cos^2\theta} = 1$ (c) [$\because 1-\sin^2\theta = \cos^2\theta$]

8) $9\sec^2\theta - 9\tan^2\theta = 9(\sec^2\theta-\tan^2\theta)$

$= 9$ (b) [$\because \sec^2\theta - \tan^2\theta = 1$]

9) $(1+\tan\theta+\sec\theta)(1+\cot\theta-\operatorname{cosec}\theta)$

$=\left(1+\frac{\sin\theta}{\cos\theta}+\frac{1}{\cos\theta}\right)\left(1+\frac{\cos\theta}{\sin\theta}-\frac{1}{\sin\theta}\right)$ [$\because \tan\theta = \sin\theta/\cos\theta$; $\operatorname{cosec}\theta = 1/\sin\theta$; $\sec\theta = 1/\cos\theta$; $\cot\theta = \cos\theta/\sin\theta$]

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

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

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

[$\sin^2\theta + \cos^2\theta = 1$]

10) $\frac{1+\tan^2\theta}{1+\cot^2\theta} = \frac{\sec^2\theta}{\operatorname{cosec}^2\theta} = \frac{1}{\cos^2\theta}\times\sin^2\theta = \tan^2\theta$ (d)