Chapter-8 Introduction to Trigonometry

WORKSHEET

MCQs

1. If $tan\theta = \frac{5}{2}$ then $\frac{4\sin\theta+\cos\theta}{4\sin\theta-\cos\theta}$ is equal to

   a) $\frac{11}{9}$ b) $\frac{3}{2}$ c) $\frac{9}{11}$ d) 4

2. If $\cos(\alpha+\beta) = 0, then\ the\ value\ of\ \cos\left(\frac{\alpha+\beta}{2}\right)\ is\ equal\ to$

   a) $\frac{1}{\sqrt{2}}$ b) $\frac{1}{2}$ c) 0 d) $\sqrt{2}$

3. If $\theta = 30°$, then $4\cos^3\theta - 3\cos\theta$ is

   a) $cos30$ b) $cos60$ c) $cos90$ d) $cos0$

4. If $tan\theta = \sqrt{3} - 1$, then $\sin\theta =$

   a) $\sqrt{3}+1$ b) $\sqrt{5-2\sqrt{3}}$ c) $\frac{\sqrt{3}-1}{\sqrt{5-2\sqrt{3}}}$ d) $\frac{\sqrt{3}-1}{\sqrt{5+2\sqrt{3}}}$

5. If $3sin\theta = 2, then\ value\ of\ 5tan^2\theta + 2\ is$

   a) 5 b) 4 c) 2 d) 6

6. If $cot\theta = \frac{1}{\sqrt{3}}, then\ the\ value\ of\ \frac{1-cos^2\theta}{2-sin^2\theta}\ is$

   a) 1 b) $\frac{5}{3}$ c) $\frac{3}{5}$ d) $-\frac{3}{5}$

7. Given $sin\theta = \frac{4}{a}, then\ tan\theta\ is$

   a) $\frac{4}{\sqrt{a^2-16}}$ b) $\frac{4}{a-2}$ c) $\frac{\sqrt{a^2-4}}{4}$ d) $\frac{a-2}{4}$

8. If $x = 3secA, y = tanA, then\ x^2 - 9y^2\ is$

   a) 3 b) -9 c) -3 d) 9

9. If $(sec^2\theta - 1)(cosec^2\theta - 1) = k, then\ value\ of\ k\ is$

   a) 1 b) -1 c) 3 d) -3

10. Given $sin\theta = \frac{a}{b}, then\ cot\theta\ is$

    a) $\frac{a}{\sqrt{b^2-a^2}}$ b) $\frac{\sqrt{b^2-a^2}}{a}$ c) $\frac{\sqrt{b^2-a^2}}{b}$ d) $\frac{b}{\sqrt{b^2-a^2}}$

11. If $x = asec\theta,\ y = btan\theta, then\ \frac{x^2}{a^2} - \frac{y^2}{b^2}\ is\ equal\ to$

    a) 0 b) 1 c) -1 d) 3

12. If $x = acos\theta, y = bsin\theta,\ then\ b^2x^2 + a^2y^2\ equals$

    a) a^2b^2 b) ab c) a^4b^4 d) $a^2 + b^2$

13.If $sin2A = 2sinA$ *is true when* A *equals*

a) 0° b) 30° c) 45° d)60°

14.If $\sin(A+B) = 1$ *and* $\cos(A-B) = 1$ *then*

a) $A = B = 90°$ b) $A = B = 0°$ c) $A = B = 45°$ d) $A = 2B$

15. If $tan\theta + cot\theta = \frac{4}{\sqrt{3}}$, *then the value of* θ *is*

a) $\theta = 60°$ *or* $30°$

b) $\theta = 0°$ *or* $45°$

c) $\theta = 45°$ *or* $30°$

d) $\theta = 60°$ *or* $90°$

16. For what value of θ , $2sin^2\theta - cos^2\theta = 2$

a) 0° b) 30° c) 60° d) 90°

17. If $sec\theta - tan\theta = a + b$, *then* $sec\theta + tan\theta$ *is*

a) $a - b$ b) $\frac{1}{a+b}$ c) $a^2 - b^2$ d) $a^2 + b^2$

2marks questions

1. Evaluate: $\frac{2sin^2 60 - tan^2 30}{sec^2 45}$
2. Find the value of $\theta, if\ \frac{1}{sec\theta - 1} - \frac{1}{sec\theta + 1} = \frac{2}{3}, where\ 0 \le \theta \le 90$ (Ans:60)
3. Simplify: $\frac{(1 - cosec^2\theta)(1 - cos\theta)(1 + cos\theta)}{1 - sin^2\theta}$ (Ans: -1)
4. Prove that $sin^2\theta cot^2\theta = 1 - cos^2\theta tan^2\theta$
5. Given that $tan\theta = \frac{a}{b}$, then find the value of $\frac{2tan\theta}{1 + tan^2\theta}$ (Ans: $\frac{2ab}{a^2 + b^2}$)
6. Find $\frac{3 - sin^2 60}{sin^2 30 + cos^2 30} - 2tan^2 30 + sec30 cosec60$ (Ans: $\frac{35}{12}$)
7. In an acute angled triangle ABC, if $\sin(A + B - c) = \frac{1}{2}$ *and* $\cos(B + C - A) = \frac{1}{\sqrt{2}}$, *then find* A, B *and* C.
8. In a triangle ABC, right angled at B, the ratio AB:AC=1:$\sqrt{2}$. Find the value of $\frac{2tan\theta}{1 + tan^2\theta}$
9. If $3x = cosec\theta$ *and* $\frac{3}{x} = cot\theta$, *find the value of* $3(x^2 - \frac{1}{x^2})$
10. If $x = asec\theta + btan\theta$ and $y = bsec\theta + atan\theta$, then prove that $x^2 - y^2 = a^2 - b^2$

11. If $\tan(A+B)=\sqrt{3}\ and\ \tan(A-B)=\frac{1}{\sqrt{3}};\ 0<A+B\leq 90,\ A>B, find\ A\ and\ B.$
12. Evaluate: $\frac{5cos^2 60+4sec^2 30-tan^2 45}{sin^2 30+cos^2 30}$

3 marks questions

1. Prove that:
   i) $\frac{tan\theta}{1-cot\theta}+\frac{cot\theta}{1-tan\theta}=1+sec\theta cosec\theta$
   ii) $\frac{sin\theta}{cot\theta+cosec\theta}-\frac{sin\theta}{cot\theta-cosec\theta}=2$
   iii) $\frac{cos\theta-sin\theta+1}{cos\theta+sin\theta-1}=\frac{1}{cosec\theta-cot\theta}$
   iv) $\frac{1}{cosec\theta-cot\theta}-\frac{1}{sin\theta}=\frac{1}{sin\theta}-\frac{1}{cosec\theta+cot\theta}$
   v) $\left(1+\frac{1}{tan^2\theta}\right)\left(1+\frac{1}{cot^2\theta}\right)=\frac{1}{sin^2\theta-sin^4\theta}$
   vi) $\frac{sinA}{cotA+cosecA}=2+\frac{sinA}{cotA-cosecA}$
   vii) $\sqrt{\frac{1+cos\theta}{1-cos\theta}}=cosec\theta+cot\theta$
   viii) $\frac{sinA}{1-cosA}+\frac{tanA}{1+cosA}=secAcosecA+cotA$
   ix) $\frac{sinA}{1+cosA}+\frac{1+cosA}{sinA}=2cosecA$
   x) $\frac{cos\theta-sin\theta+1}{cos\theta+sin\theta-1}=\frac{sin\theta}{1-cos\theta}$
2. If $cos\theta+sin\theta=1, then\ prove\ that\ cos\theta-sin\theta=\pm 1$
3. In a right angled triangle , right angled at C. If $\tan(C-B-A)=0$ and $\tan(B+C-A)=\sqrt{3}$, find the value of A and B.
4. If $15cot^2\theta+4cosec^2\theta=23$, then find the value of $\frac{1-tan^2\theta}{1+tan^2\theta}$
5. If $7sin^2\theta+3cos^2\theta=4, then\ show\ that\ \theta=30$
6. If $tan\theta+sin\theta=m\ and\ tan\theta-sin\theta=n, show\ that\ m^2-n^2=4\sqrt{mn}$.