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Class: X
Subject: Mathematics
Topic: Trigonometry
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

Q1. If cos A = 4/5, then the value of tan A is

(a) 3/5
(b) 3/4
(c) 4/3
(d) 5/3

Sol: (b)

cos A = $\frac{4}{5} = \frac{B}{4}$

Tan A = $\frac{P}{B} = \frac{\sqrt{H^2+B^2}}{B} = \frac{3}{4}$

Q2. If sin A = 1/2, then the value of cot A is

(a) $\sqrt{3}$
(b) $1/\sqrt{3}$
(c) $\sqrt{3}/2$
(d) 1

Sol: (a)

sin A = ½ = p/h B = $\sqrt{2^2+1^2}$ = $\sqrt{3}$

Cot A = $\frac{B}{P} = \sqrt{3}$

Q3. The value of the expression [cosec (75° + θ) – sec (15° – θ) – tan (55° + θ) + cot (35° – θ)] is

(a) – 1
(b) 0
(c) 1
(d) 3/2

Sol: (b)

cosec (90 - θ) = sec θ

Cosec θ = Sec (90 - θ)

Cosec (75 + θ) = sec [90 – (75 + θ)]

= sec (15 – θ)

Similarly, cot (35 - θ) = tan (55 + θ)

Using this value, given expression will be 0

Q4. Given that sinq= a/b, then cosq is equal to

(a) $b/\sqrt{b^2-a^2}$

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

Sol: (c)

sinq = a/b = $\frac{P}{H}$

Cosq = $B/H = \frac{\sqrt{H^2-P^2}}{H} = \frac{\sqrt{b^2-a^2}}{b}$

Q5. If cos (a + b) = 0, then sin (a - b) can be reduced to

(a) cos b
(b) cos 2b
(c) sin a
(d) sin 2a

Sol: (b)

cos (a+b) = 0

a+b = $\frac{\lambda}{2}$

a = $\frac{\lambda}{2} - b$

sin (a-b) = sin ($\frac{\lambda}{2}$ -6-6)

= sin ($\frac{\lambda}{2} - 2b$) = cos2b

Q6. The value of (tan1° tan 2° tan3° ... tan 89°) is

(a) 0
(b) 1
(c) 2
(d)1 / 2

Sol: (b)

tan 89 = tan (90^o-1^o)

= cot 2^o

Fly tan 88 = cot 2^o

An so on

Tan 89 tan 1^0 = cot 1^o tan 1^o = 1

Tan 48 = 1

Tan 1^o tan 89^o tan 2^o tan 88^o tan 45^o

= 1

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Q7. If cos 9α= sinα and 9α < 90°, then the value of tan5α is

(a) 1/√3
(b) √ 3
(c) 1
(d) 0

Sol: (c)

cos 9 $\propto$ = cos ($\frac{\bar{\Lambda}}{2}\propto$)
$9\propto = \frac{\bar{\Lambda}}{2} - 4$
$10 \propto = \frac{\bar{\Lambda}}{2}$ $\propto = \frac{\bar{\Lambda}}{20}$
tan 5 $\propto$ = tan $\frac{\bar{\Lambda}}{4}$ = 1

Q8. If ΔABC is right angled at C, then the value of cos (A+B) is

(a) 0
(b) 1
(c) 1/2
(d)√3/2

Sol: (a)

$\angle A+\angle B+\angle C = 180$
$\angle A+\angle B = 180 - 90 = 90$
$\cos(A+B) = \cos 90 = 0$

Q9. If sin A + $\sin^2$ A = 1, then the value of the expression ($\cos^2$A + $\cos^4$A) is

(a) 1
(b) 1/2
(c) 2
(d) 3

Sol: (a)

sinA + $\sin^2$ A = 1
Sin = 1- $\sin^2$ A
$\cos^2$A (1+$\cos^2$A) = (1- $\sin^2$A) (1+ 1- $\sin^2$A)
= (sinA) (1+sin A)
= sinA + sinA
= 1

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Q10. Given that $\sin\alpha = 1/2$ and $\cos\beta = 1/2$, then the value of $(\alpha + \beta)$ is

(a) 0°
(b) 30°
(c) 60°
(d) 90°

Sol: (d)

$\sin\propto = 1/2 \quad \propto = \propto/6$
Cos B = 1/2 B = $\propto/3$
$\propto + B = 90^{O}$

Q11. The value of the expression
$[\sin^2 22° \sin^2 68° / \cos^2 22° \cos^2 68° + \sin^2 63° + \cos 63° \sin 27°]$ is

(a) 3
(b) 2
(c) 1
(d) 0

Sol: (b)

sin 22 = cos 68
Sin 68 = cos 22
$\frac{\sin^2 22 \sin^2 68}{\cos^2 22 \cos^2 68} = \frac{\cos^2 68 \cos^2 22}{cos^2 22 \cos^2 68}$
= 1
$\sin^2 63 + \cos 63 \sin 27$
$\sin^2 63 + \cos 63 \cos 63$
$\sin^2 63 + \cos^2 63$
= 1

Q12. If $4\tan\theta = 3$, then $[4\sin\theta - \cos\theta] / [4\sin\theta + \cos\theta]$ is equal to

(a) 2/3
(b) 1/3
(c) 1/2
(d) 3/4

Sol: (c)

$\tan^2 = \frac{3}{9} = \frac{A}{B}$
$\sin\theta = \frac{3}{5} \cos\theta = \frac{4}{5}$

$$\frac{4sin\theta - cos\theta}{4sin\theta + cos\theta} = \frac{\frac{4X3}{5} - \frac{4}{5}}{4\ X\ \frac{3}{5} + \frac{4}{5}}$$

$= \frac{2}{4} = \frac{1}{2}$

Q13. If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is

(a) 1

(b) 3/4

(c) 1/2

(d) 1/4

Sol: (c)

$\sin\theta = \cos\theta$

$\theta = 45°$

$\text{Sin}^4\ \theta + \cos^4\ \theta = 2\ \sin^4\theta$

$= 2\ \sin^4\ 45°$

$= 2\ (\frac{1}{\sqrt{2}})^4$

$= 2\ x\frac{1}{4} = ½$

Q14. $\sin(45° + \theta) - \cos(45° - \theta)$ is equal to

(a) $2\cos\theta$

(b) 0

(c) $2\sin\theta$

(d) 1

Sol: (b)

$\sin(45+\theta) - \cos(45 - \theta)$

$\text{Sin}(45 + \theta) - \cos(90 - 45+\theta)$

$\text{Sin}(45+0) - \sin(45 + 0)$

$= 0$

Q15. A pole 6 m high casts a shadow $2\sqrt{3}$m long on the ground, then the Sun's elevation is

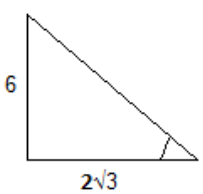
(A\) 60°

(b) 45°

(c) 30°

(d) 90°

Sol: (a)



$\text{Tan}0 = \frac{P}{B} = \frac{6}{2\sqrt{3}} = \sqrt{3}$

$\theta = 60$

Q16. The value of $(1 + \cos\theta)(1 - \cos\theta)\,\text{cosec}^2\theta$ = _____

(a) 0

(b) 1

(c) $\cos^2\theta$

(d) $\sin^2\theta$

Sol: (b)

$(1+\cos\theta)(1-\cos\theta)\,\text{cosec}^2\theta$

$(1-\cos^2\theta)\,\text{cosec}^{2=}\theta$

$\sin^2\theta\,\text{cosec}^2\theta$

= 1

Q17. ΔTRY is a right-angled isosceles triangle then cos T + cos R + cos Y is _____

(a) $\sqrt{2}$ (b) $2\sqrt{2}$

(c) $1+\sqrt{2}$ (d) $1+\frac{1}{\sqrt{2}}$

Sol: (a) Rt $\angle$ isosceler Δ has angles $90, 45, 45$

$\text{Cos } 90 + \cos 45 + \cos 45$

$0 + 1/\sqrt{2} + 1/\sqrt{2}$

$= 2/\sqrt{2} = \sqrt{2}$

Q18.

If $\tan\theta = \frac{1}{\sqrt{7}}$, *then* $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta} =$

(a) $\frac{3}{4}$ (b) $\frac{5}{7}$

(c) $\frac{3}{7}$ (d) $\frac{1}{12}$

Sol: (a)

$\tan\theta = 1/\sqrt{7}$

P = 1

B = $\sqrt{7}$

H = $\sqrt{1+7}$

= $2\sqrt{2}$

$$\frac{COSES^2\theta - Sec\ ^2\theta}{cosec^2 + \sec^2\theta} = \frac{\left(\frac{H}{p}\right)^2 - \left(\frac{H}{b}\right)^2}{\left(\frac{H}{P}\right)^2 + \left(\frac{H}{B}\right)^2}$$

$$= \frac{\frac{8-}{\frac{1}{8}}}{\frac{\frac{8}{7}}{\frac{8}{7}}} = \qquad \frac{6}{8} = \frac{3}{4}$$

Q19. If 3 sec θ – 5 = 0 then cot θ = _____

(a) 5 /3

(b) 4/ 5

(c) 3 /4

(d) 3/ 5

Sol:c $\sec\theta = 5/3 = \frac{4}{b}$

$\cot\theta = \frac{B}{p} = \frac{3}{4}$

Q20.

If $\sec\theta + \tan\theta = x$, then $\sec\theta =$

(a) $\frac{x^2+1}{x}$

(b) $\frac{x^2+1}{2x}$

(c) $\frac{x^2-1}{2x}$

(d) $\frac{x^2-1}{x}$

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Sol:b $\sec\theta + \tan\theta = x$

$$\frac{(sec\theta+\tan\theta)\,(sec\theta-\tan\theta)}{(sec\theta-\tan\theta)} = x$$

$$\frac{\sec^2\theta - \tan^2\theta}{sec\theta - \tan\theta} = x$$

$$\frac{1}{sec\theta-\tan\theta} = x$$

$\sec\theta - \tan\theta = 1/x$

Adding 1 and 2

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

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