MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

FACTORIZATION FORMULAE

Exercise 1

1. The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is

A. 0

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{\sqrt{2}}$

Answer: A

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2. $\frac{\cos x}{\cos(x-2y)} = \lambda \Rightarrow \tan(x-y)\tan y =$

A. $\frac{1+\lambda}{1-\lambda}$

B. $\frac{1-\lambda}{1+\lambda}$

C. $\frac{\lambda}{1+\lambda}$

D. $\frac{\lambda}{1-\lambda}$

Answer: B

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3. $\sin 47^\circ + \sin 61^\circ - \sin 11^\circ - \sin 25^\circ =$

A. $\sin 7^\circ$

B. $\cos 7^\circ$

C. $\sin 36^\circ$

D. $\cos 36^\circ$

Answer: B

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4. If $\sin(x + 3\alpha) = 3\sin(\alpha - x)$, then

A. $\tan x = \tan \alpha$

B. $\tan x = \tan^2 \alpha$

C. $\tan x = \tan^3 \alpha$

D. $\tan x = 3 \tan \alpha$

Answer: C

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5. If $A + C = 2B, then \frac{\cos C - \cos A}{\sin A - \sin C} =$

A. cot B

B. cot 2B

C. tan 2B

D. tan B

Answer: D

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6. $\sin 12^\circ \sin 48^\circ \sin 54^\circ =$

A. $\frac{1}{16}$

B. $\frac{1}{32}$

C. $\frac{1}{8}$

D. $\frac{1}{4}$

Answer: C

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7. $\sin 36^o \sin 72^o \sin 108^o \sin 144^o =$

A. $\frac{1}{4}$

B. $\frac{1}{16}$

C. $\frac{3}{4}$

D. $\frac{5}{16}$

Answer: D

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8. If $p = \cos 55^\circ, q = \cos 65^\circ$ and $r = \cos 175^\circ$, then the value of $\frac{1}{p} + \frac{1}{q} + \frac{r}{pq}$ is

A. 0

B. -1

C. 1

D. None of these

Answer: A

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9. If $\alpha + \beta + \gamma = 2\theta$,then

$\cos\theta + \cos(\theta - \alpha) + \cos(\theta - \beta) + \cos(\theta - \gamma)$ =

A. $4\sin.\ \frac{\alpha}{2}.\cos.\ \frac{\beta}{2}.\sin.\ \frac{\gamma}{2}$

B. $4\cos.\ \frac{\alpha}{2}.\cos.\ \frac{\beta}{2}.\cos.\ \frac{\gamma}{2}$

C. $4\sin.\ \frac{\alpha}{2}.\sin.\ \frac{\beta}{2}.\sin.\ \frac{\gamma}{2}$

D. $4\sin\alpha.\sin\beta.\sin\gamma$

Answer: B

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10. If $\cos x = 3\cos y$, then $2\tan.\ \frac{y-x}{2}$ is equal to

A. $\cot\left(\frac{y-x}{2}\right)$

B. $\cot\left(\frac{x+y}{4}\right)$

C. $\cot\left(\frac{y-x}{4}\right)$

D. $\cot\left(\frac{x+y}{2}\right)$

Answer: D

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11. The value of $\cos\left(\frac{\pi}{15}\right)\cos\left(\frac{2\pi}{15}\right)\cos\left(\frac{4\pi}{15}\right)\cos\left(\frac{8\pi}{15}\right) =$

A. $\frac{1}{16}$

B. $-\frac{1}{16}$

C. 1

D. 0

Answer: B

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12. If $A = 35^\circ$, $B = 15^\circ$ and $C = 40^\circ$, then tan A. tan B + tan B. tan C tan C. tan A is equal to

A. 0

B. 1

C. 2

D. 3

Answer: B

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13. If $\sin\theta = 3\sin(\theta + 2\alpha)$, then the value of $\tan(\theta + \alpha) + 2\tan\alpha$ is

A. 3

B. 2

C. -1

D. 0

Answer: D

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14. If $\alpha, \beta, \gamma \in [0, \pi]$ and α, β, γ are in AP, then $\frac{\sin\alpha - \sin\gamma}{\cos\gamma - \cos\alpha}$ is equal to

A. $\sin\beta$

B. $\cos\beta$

C. $\cot\beta$

D. $\cos ec\beta$

Answer: C

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15. $\cos. \frac{2\pi}{7} + \cos. \frac{4\pi}{7} + \cos. \frac{6\pi}{7}$

A. is equal to zero

B. lies between 0 and 3

C. is a negative number

D. lies between 3 and 6

Answer: C

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16. Find the value $\tan\left(\frac{\pi}{5}\right) + 2\tan\left(\frac{2\pi}{5}\right) + 4\cot\left(\frac{4\pi}{5}\right)$.

A. $\cot.\ \frac{\pi}{5}$

B. $\cot.\ \frac{2\pi}{5}$

C. $\cot.\ \frac{4\pi}{5}$

D. $\cot.\ \frac{3\pi}{5}$

Answer: A

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17. if x and y are acute angles such that $\cos x + \cos y = \frac{3}{2}$ and $\sin x + \sin y = \frac{3}{4}$ then $\sin(x + y) =$

A. $\frac{2}{5}$

B. $\frac{3}{4}$

C. $\frac{3}{5}$

D. $\frac{4}{5}$

Answer: D

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18. If in a ΔABC, $A = 30^\circ$, $B = 45^\circ$ and a = 1, then the values of b and c are respectively

A. $\sqrt{2}, \frac{\sqrt{3}+1}{\sqrt{2}}$

B. $\sqrt{2}, \frac{\sqrt{3}-1}{\sqrt{2}}$

C. $\sqrt{3}, \frac{\sqrt{3}-1}{\sqrt{2}}$

D. $\sqrt{2}, \frac{\sqrt{3}+2}{\sqrt{2}}$

Answer: A

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19. If $A = 75^0, b = 45^0,$ then prove that $b + c\sqrt{2} = 2a$

A. 2a

B. 2a+1

C. 3a

D. 2a-1

Answer: A

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20. If a^2, b^2 and c^2 are in AP, then cotA, cotB and cotC are in

A. AP

B. GP

C. HP

D. AGP

Answer: A

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21. In a $\Delta ABC, \left(\frac{b}{c}+\frac{c}{b}\right)\cos A+\left(\frac{a}{b}+\frac{b}{a}\right)\cos C+\left(\frac{a}{c}+\frac{c}{a}\right)\cos B$ is equal to

A. 4

B. 5

C. 3

D. 2

Answer: C

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22. If in a ΔABC, the tangent of half the difference of two angles is one-third the tangent of half the sum of the angles. Then, the ratio of the sides opposite to the angles is

A. $2:1$

B. $1:2$

C. $3:1$

D. $1:1$

Answer: A

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23. If $A+B+C=\pi$ then $\sin 2A+\sin 2B+\sin 2C=$

A. 4 sin A sin B sin C

B. 4 cos A cos B cos C

C. 2 cos A cos B cos C

D. 2 sin A sin B sin C

Answer: A

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24. If $A + B = C,$ then

$\cos^2 A + \cos^2 B + \cos^2 C - 2\cos A \cos B \cos C =$

A. 1

B. 2

C. 0

D. 3

Answer: A

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25. If $\alpha + \beta - \gamma = \pi$, then $\sin^2\alpha + \sin^2\beta - \sin^2\gamma$ is equal to

A. $2\sin\alpha\sin\beta\cos\gamma$

B. $2\cos\alpha\cos\beta\cos\gamma$

C. $2\sin\alpha\sin\beta\sin\gamma$

D. None of these

Answer: A

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26. If $A+B+C=180^\circ$, then $\Sigma \tan.\ \frac{A}{2} \tan.\ \frac{B}{2}$ is

A. 0

B. 1

C. 2

D. 3

Answer: B

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27. In a ΔABC, $\cos\left(\frac{B+2C+3A}{2}\right)+\cos\left(\frac{A-B}{2}\right)=$

A. -1

B. 0

C. 1

D. 2

Answer: B

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28. Let A, B and C are the angles of a plain triangle and $\tan\left(\frac{A}{2}\right)=\frac{1}{3}, \tan\left(\frac{B}{2}\right)=\frac{2}{3}$ .then $\tan\left(\frac{C}{2}\right)$ is equal to

A. $1/3$

B. $2/3$

C. $2/9$

D. $7/9$

Answer: D

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29. If $A + B + C = 3\frac{\pi}{2}$. Then $\cos 2A + \cos 2B + \cos 2C$ is equal to

A. 4sinAsinBsinC

B. 4cosAcosBcosC

C. 1-4sinAsinBsinC

D. 1-4cosAcosBcosC

Answer: C

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30. If $A+B+C=\pi$, then $\sin 2A+\sin 2B-\sin 2C$ is equal to

A. 4sinAsinBsinC

B. 4cosAcosBsinC

C. 4cosAcosBcosC

D. None of these

Answer: B

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31. The value f $\tan A+\tan B+\tan C$ is (A) $\left(3+\frac{\sqrt{3}}{\sqrt{3}-1}\right.$ (B) $\left(\sqrt{3}+\frac{4}{\sqrt{3}-1}\right.$ (C) $\left(6-\frac{\sqrt{3}}{\sqrt{3}-1}\right.$ (D) $\left(\sqrt{3}+\frac{\sqrt{2}}{\sqrt{3}-1}\right.$

A. $45^\circ, 60^\circ$ and 75°

B. $30^\circ, 60^\circ$ and 75°

C. $45^\circ, 30^\circ$ and 75°

D. $75^\circ, 90^\circ$ and 30°

Answer: A

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32. If $A + B + C = \pi$, then $\cos^2 A + \cos^2 B + \cos^2 C$ is equal to

A. 1-cosAcosBcosC

B. 1-2sinAsinBsinC

C. 1-sinAsinBsinC

D. 1-2cosAcosBcosC

Answer: D

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33. In ΔABC, if 2s=a+b+c , then the value of $\frac{s(s-a)}{bc} - \frac{(s-b)(s-c)}{bc}$ is

A. sin A

B. cos A

C. tan A

D. None of these

Answer: B

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34. If $\Delta = a^2 - (b-c)^2$, Δ is the area of the ΔABC then $\tan A = ?$

A. $\frac{8}{14}$

B. $\frac{8}{13}$

C. $\frac{8}{15}$

D. $\frac{8}{17}$

Answer: C

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Exercise 2

1. The vlaue of $\cos^2 76^\circ + \cos^2 16 - \cos 76^\circ \cos 16^\circ$, is

A. $\frac{-1}{4}$

B. $\frac{1}{2}$

C. 0

D. $\frac{3}{4}$

Answer: D

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2. The value of $\cos 52^\circ + \cos 68^\circ + \cos 172^\circ$ is

A. 0

B. 1

C. 2

D. $\frac{3}{2}$

Answer: A

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3. The value of $\sin\frac{\pi}{16}\sin\frac{3\pi}{16}\sin\frac{5\pi}{16}\sin\frac{7\pi}{16}$ is

A. $\frac{1}{16}$

B. $\frac{\sqrt{2}}{16}$

C. $\frac{1}{8}$

D. $\frac{\sqrt{2}}{8}$

Answer: B

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4. The value of $\cot 70^\circ + 4\cos 70^\circ$ is

A. $\frac{1}{\sqrt{3}}$

B. $\sqrt{3}$

C. $2\sqrt{3}$

D. $\frac{1}{2}$

Answer: B

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5. $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$

A. -1

B. 0

C. 1

D. None of these

Answer: B

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6. If $A + B + C = \pi$ and $\sin C + \sin A \cos B = 0,$ then tanA.cotB is equal to

A. 0

B. $-\frac{1}{2}$

C. 1

D. -1

Answer: B

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7. If $x + y + z = 180^\circ$, then $\cos 2x + \cos 2y - \cos 2z$ is equal to

A. 4sinx. siny. sinz

B. 1-4sinx.siny.cosz

C. 4sinx.siny.sinz-1

D. cosA.cosB.cosC

Answer: B

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8. If $A + B + C = \pi$ and $m\angle C$ is obtuse then $\tan A . \tan B$ is

A. $\tan A \tan B > 1$

B. $\tan A \tan B < 1$

C. tanAtanB=1

D. None of these

Answer: B

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9. If $A + B + C = 180^\circ$, then $\frac{\sin 2A + \sin 2B + \sin 2C}{\cos A + \cos B + \cos C - 1}$ is equal to

A. $8 \sin. \frac{A}{2} \sin. \frac{B}{2} \sin. \frac{C}{2}$

B. $8 \cos. \frac{A}{2} \cos. \frac{B}{2} \cos. \frac{C}{2}$

C. $8 \sin. \frac{A}{2} \cos. \frac{B}{2} \cos. \frac{C}{2}$

D. $8 \cos. \frac{A}{2} \sin. \frac{B}{2} \sin. \frac{C}{2}$

Answer: B

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10. If $A + B + C = 270^\circ$, then $\cos 2A + \cos 2B + \cos 2C + 4 \sin A \sin B \sin C =$

A. 0

B. 1

C. 2

D. 3

Answer: B

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11. If A, B, C are the angles of a triangle then $\sin^2 A + \sin^2 B + \sin^2 C - 2\cos A \cos B \cos C$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: B

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12. If $A+B+C=180^\circ$, then the value of $\cot.\frac{A}{2}+\cot.\frac{B}{2}+\cot.\frac{C}{2}$ will be

A. $2\cot.\frac{A}{2}\cot.\frac{B}{2}\cot.\frac{C}{2}$

B. $4\cot.\frac{A}{2}\cot.\frac{B}{2}\cot.\frac{C}{2}$

C. $\cot.\frac{A}{2}\cot.\frac{B}{2}\cot.\frac{C}{2}$

D. $8\cot.\frac{A}{2}\cot.\frac{B}{2}\cot.\frac{C}{2}$

Answer: C

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13. In triangle $ABC, \tan A + \tan B + \tan C = 6 and tan A \tan B = 2,$ then the values of $\tan A, \tan B, \tan C$ are, respectively $1, 2, 3$ (b) $3, 2/3, 7/3$ $4, 1/2, 3/2$ (d) none of these

A. 1, 2, 3

B. 0, 1, 2

C. 1, 2, 0

D. None of these

Answer: A

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14. If a ΔABC, the value of sinA+sinB+sinC is

A. $4\sin.\frac{A}{2}\sin.\frac{B}{2}\sin.\frac{C}{2}$

B. $4\cos.\frac{A}{2}\cos.\frac{B}{2}\cos.\frac{C}{2}$

C. $4\cos.\frac{A}{2}\sin.\frac{B}{2}\sin.\frac{C}{2}$

D. $4\cos.\frac{A}{2}\sin.\frac{B}{2}\cos.\frac{C}{2}$

Answer: B

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15. If cosA=cosBcosC and $A+B+C=\pi$, then the value of cotBcotC is

A. 1

B. 2

C. $\frac{1}{3}$

D. $\frac{1}{2}$

Answer: D

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16. If $\sin\theta + \sin 2\theta + \sin 3\theta = \sin\alpha$ and $\cos\theta + \cos 2\theta + \cos 3\theta = \cos\alpha$, then θ is equal to

A. $\frac{\alpha}{2}$

B. α

C. 2α

D. $\frac{\alpha}{6}$

Answer: A

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17. $\tan 20^0 \tan 40^0 \tan 60^0 \tan 80^0$

A. 1

B. 2

C. 3

D. $\frac{\sqrt{3}}{2}$

Answer: C

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18. $\sin 12^\circ \sin 48^\circ \sin 54^\circ =$

A. $\frac{1}{16}$

B. $\frac{1}{32}$

C. $\frac{1}{8}$

D. $\frac{1}{4}$

Answer: C

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19. If A, B, C, D be the angles of acyclic quadrilateral, show that : $\cos A + \cos B + \cos C + \cos D = 0$.

A. 2(cosA+cosC)

B. 2(cosA+cosB)

C. 2(cosA+cosD)

D. 0

Answer: D

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20. If $A+B+C=\pi$, prove that : $\frac{\cos A}{\sin b \sin C}+\frac{\cos B}{\sin C \sin}+\frac{\cos C}{\sin A \sin B}=2.$

A. 0

B. 1

C. 2

D. 3

Answer: C

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21. If ABCD is a cyclic quadrilateral, then the value of cosA-cosB+cosC-cosD is equal to

A. 0

B. 1

C. 2(cosB-cosD)

D. 2(cosA-cosC)

Answer: A

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