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ELEMENTARY TRIGONOMETRY

XII- ASSIGNMENT

- If $\frac{3\pi}{2} < \theta < 2\pi$, then $2 \sin \frac{\theta}{2}$ equals
 - $\sqrt{1 + \sin \theta} + \sqrt{1 - \sin \theta}$
 - $-\sqrt{1 + \sin \theta} + \sqrt{1 - \sin \theta}$
 - $\sqrt{1 + \sin \theta} - \sqrt{1 - \sin \theta}$
 - $-\sqrt{1 + \sin \theta} - \sqrt{1 - \sin \theta}$
- If $A = 840^\circ$ then $2 \sin (A/2)$ equals
 - $\sqrt{1 + \sin A} + \sqrt{1 - \sin A}$
 - $-\sqrt{1 + \sin A} + \sqrt{1 - \sin A}$
 - $\sqrt{1 + \sin A} - \sqrt{1 - \sin A}$
 - $-\sqrt{1 + \sin A} - \sqrt{1 - \sin A}$
- If $\pi/2 < \alpha < \pi$ then the expression $\sqrt{\frac{1 - \sin \alpha}{1 + \sin \alpha}} + \sqrt{\frac{1 + \sin \alpha}{1 - \sin \alpha}}$ equals
 - $\frac{1}{\cos \alpha}$
 - $\frac{2}{\cos \alpha}$
 - $-\frac{2}{\cos \alpha}$
 - 0
- If $\tan \theta = 4/3$ ($\pi < \theta < 3\pi/2$) then $\cos \theta/2$ equals
 - $\sqrt{\frac{1}{5}}$
 - $\sqrt{\frac{2}{5}}$
 - $-\sqrt{\frac{2}{5}}$
 - $-\sqrt{\frac{1}{5}}$
- If $\pi < \theta < \frac{3\pi}{2}$ and $\cos \theta = 3/5$ then $\tan(\frac{\theta}{4})$ equals
 - $\frac{\sqrt{5}-1}{2}$
 - $\frac{\sqrt{5}+1}{2}$
 - $\frac{-\sqrt{5}+1}{2}$
 - $\frac{-\sqrt{5}-1}{2}$
- If $\cos x - \sin x = -\frac{5}{4}$ where $\frac{\pi}{2} < x < \frac{3\pi}{2}$ then $\cot(\frac{x}{2})$ equals
 - $\frac{4-\sqrt{7}}{9}$
 - 8
 - 8
 - $\frac{4+\sqrt{7}}{9}$
- If $x = \sin \theta |\sin \theta|$, $y = \cos \theta |\cos \theta|$ where $\frac{99\pi}{2} \leq \theta \leq 50\pi$, then
 - $x - y = 1$
 - $x + y = -1$
 - $x + y = 1$
 - $y - x = 1$
- If $\frac{3\pi}{4} < \theta < \pi$ then $\sqrt{\frac{2}{\tan \theta}} + \frac{1}{\sin^2 \theta}$ equals
 - $1 + \cot \theta$
 - $-1 + \cot \theta$
 - $1 - \cot \theta$
 - $-1 - \cot \theta$
- If $\frac{3\pi}{4} < \theta < \pi$ then $\sqrt{\frac{1 + \sin 2\theta}{\sin^2 \theta}} + \sqrt{\frac{1 + \sin 2\theta}{\cos^2 \theta}}$ equals
 - $2 + \tan \theta + \cot \theta$
 - $\tan \theta - \cot \theta$
 - $\cot \theta - \tan \theta$
 - $-2 - \tan \theta - \cot \theta$
- If $2\pi < \alpha < \frac{5\pi}{2}$, $0 < \beta < \frac{\pi}{2}$ and $\cos \alpha + \cos \beta = 1/3$, $\sin \alpha + \sin \beta = 1/4$ then $\cos \frac{\alpha - \beta}{2}$ equals
 - $5/24$
 - $-5/24$
 - $\pm 5/4$
 - None of these
- If $\sin A = 3/\sqrt{13}$, $\cos B = 5/\sqrt{26}$ where A is obtuse and B is acute angle then A + B equals
 - 45°
 - 135°
 - $\sin^{-1} \frac{15}{\sqrt{338}}$
 - none of these
- If $\cos(\alpha + \beta) = 4/5$, $\sin(\alpha - \beta) = 5/13$ and α, β lie between 0 and $\pi/4$ then $\tan 2\alpha$ equals
 - $25/16$
 - $56/33$
 - $19/12$
 - $20/7$
- If $\sin A = 1/\sqrt{5}$, $\cos B = -\frac{3}{\sqrt{10}}$ where A is acute and B is obtuse then A - B equals
 - $-\frac{\pi}{4}$
 - $\frac{\pi}{4}$
 - $\frac{-3\pi}{4}$
 - $\frac{3\pi}{4}$
- If $4 \sin \theta + 3 \cos \theta = 7/5$ then $3 \sin \theta + 2 \cos \theta$ equals
 - $2/5$
 - $4/5$
 - $6/5$
 - None of these
- If $\sin(x + \frac{4\pi}{9}) = a$; $\frac{\pi}{9} < x < \frac{\pi}{3}$ then $\cos(x + \frac{7\pi}{9})$ equals
 - $\frac{\sqrt{1-a^2}-a\sqrt{3}}{2}$
 - $\frac{1-a^2+a\sqrt{3}}{2}$
 - $\frac{a\sqrt{3}-\sqrt{1-a^2}}{2}$
 - $\frac{-\sqrt{1-a^2}-\sqrt{3}a}{2}$
- $\tan 6A - \tan 5A - \tan A$ equals
 - 0
 - $\tan 12A$

- a) 0 b)1 c)-1 d) none of these
 33. If $\sec\theta + \cos\theta = 2$, then $\sec^3\theta (1 + \sec^3\theta) + \cos^3\theta (1 + \cos^3\theta)$ equal
 a) 2 b) 4 c) 6 d) 8

34. If $\sin A + \operatorname{cosec} A + 2 = 0$ then $\sin^3 A + \operatorname{cosec} A + 2$ equal
 a) 1 b) -1 c) 0 d) none of these

35. The value of $(1 + \sin\pi/5) (1 + \sin 3\pi/5) (1 + \sin 7\pi/5) (1 + \sin 9\pi/5)$ is
 a) $1/16$ b) $5/16$ c) $1/8$ d) $3/16$

36. The value of $\cot 91^\circ \cot 92^\circ \cot 93^\circ \cot 94^\circ \dots \cot 178^\circ \cot 178^\circ$ is
 a) 0 b) 1 c) -1 d) infinite

37. The value of $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$ is equal
 a) 2 b) $2 \sin 20^\circ / \sin 40^\circ$ c) 4 d) $4 \sin 20^\circ / \sin 40^\circ$

38. If $k = \sin \pi/18 \sin 5\pi/18 \sin 7\pi/18$ then k equals to
 a) $1/8$ b) $1/16$ c) $-1/8$ d) -1

39. The value of $\sin\pi/14 \sin 3\pi/14 \sin 5\pi/14 \sin 7\pi/14 \sin 9\pi/14 \sin 11\pi/14 \sin 13\pi/14$ equal
 a) $1/8$ b) $1/16$ c) $1/64$ d) $1/128$

40. $\cos 2\pi/7 + \cos 4\pi/7 + \cos 6\pi/7$ equals
 a) $1/2$ b) $-1/2$ c) 0 d) an irrational number

41. $\cot 142 \frac{1}{2}^\circ$ equals
 a) $\sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{6}$ b) $\sqrt{2} + \sqrt{3} - \sqrt{4} + \sqrt{6}$
 c) $\sqrt{2} + \sqrt{3} - \sqrt{4} - \sqrt{6}$ d) $\sqrt{2} - \sqrt{3} - \sqrt{4} - \sqrt{6}$

42. $\cot 6^\circ \cot 42^\circ \cot 66^\circ \cot 78^\circ$ equals
 a) 1 b) $1/16$ c) $1/8$ d) $3/16$

43. $\cos 10^\circ \cos 30^\circ \cos 50^\circ \cos 70^\circ$ equals
 a) $\sqrt{3}/8$ b) $1/16$ c) 1 d) $3/16$

44. $\tan 7 \frac{1}{2}^\circ + \cot 7 \frac{1}{2}^\circ$ equals
 a) $\sqrt{2}/(\sqrt{3}-1)$ b) $4\sqrt{2}/(\sqrt{3}+1)$ c) $2\sqrt{2}/(\sqrt{3}+1)$ d) $2\sqrt{2}(\sqrt{3}+1)$

45. The value of $\cos 12^\circ \cos 24^\circ \cos 36^\circ \cos 48^\circ \cos 60^\circ \cos 72^\circ \cos 84^\circ$ is
 a) $1/64$ b) $-1/64$ c) $1/128$ d) $-1/128$

46. If $\alpha = \pi/15$ then $\cos 2\alpha \cos 4\alpha \cos 8\alpha \cos 14\alpha$ equals
 a) 0 b) 1 c) $1/16$ d) $-1/16$

47. $\sin 12^\circ \sin 48^\circ \sin 54^\circ$ equals
 a) $1/8$ b) $1/16$ c) $1/4$ d) $3/8$

48. $\cos \pi/65 \cos 2\pi/65 \cos 4\pi/65 \cos 8\pi/65 \cos 16\pi/65 \cos 32\pi/65$ equals
 a) $1/32$ b) $1/64$ c) $1/128$ d) 1

49. $(1 + \cos \pi/8) (1 + \cos 3\pi/8) (1 + \cos 5\pi/8) (1 + \cos 7\pi/8)$ equals

a) 1/16 b) 1/4 c) 1/2 d) 1/8

50. $\sum_{r=1}^9 \sin 2r\pi/18$ equals

a) 0 b) 4 c) 5 d) 1

51. The value of $\tan 20^\circ + 2\tan 50^\circ - \tan 70^\circ$ is

a) 1 b) 0 c) $\tan 50^\circ$ d) none of these

52. which of the following is smallest

a) $\sin 1$ b) $\sin 2$ c) $\sin 3$ d) $\sin 4$

53. which of the following is greatest

a) $\sin 1$ b) $\cos 1$ c) $\tan 1$ d) $\cot 1$

54. $\sec^2 \theta = 4xy/(x+y)^2$ is true if and only if

a) $x+y \neq 0$ b) $x=y, x \neq 0$ c) $x=y$ d) $|x| \neq 0, |y| \neq 0$

55. $\sin \theta = (x^2+y^2)/(x^2-y^2)$, where $x, y \in \mathbb{R}$, gives real value if and only if

a) $x=y \neq 0$ b) $|x| = |y| = 0$ c) $x+y=0, x \neq 0$ d) none of these

56. Greatest and least value of $7 \cos \theta + 24 \sin \theta$ are respectively

a) -25, 25 b) 25, -25 c) 33, -33 d) 24, 7

57. If $y = 5 \cos \theta + 3 \cos(\theta + \pi/3) + 3$ then

a) $-7 \leq y \leq 7$ b) $-4 \leq y \leq 10$ c) $-10 \leq y \leq 4$ d) $-10 \leq y \leq 10$

58. If $\alpha + \beta = 90^\circ$, then maximum value of $\cos \alpha \cos \beta$ is

a) 1 b) 2 c) 1/2 d) -1/2

59. solution of $\sin^2 \theta + 2 \sin \theta \cos \theta + 3 \cos^2 \theta = k$ is possible if

a) $2 - \sqrt{2} \leq k \leq 2 + \sqrt{2}$ b) $-2 + \sqrt{2} \leq k \leq 2 + \sqrt{2}$
c) $-2\sqrt{2} \leq k \leq 2 - \sqrt{2}$ d) none of these

60. If $\alpha + \beta = \pi/4$. α, β