7.3: (Double-Angle, Half-Angle)

If $\tan\alpha = -\frac{4}{3}, \frac{3\pi}{2} < \alpha < 2\pi$, then $\sec\frac{\alpha}{2} =$ (a) $-\frac{\sqrt{5}}{2}$ (b) $\frac{2}{\sqrt{3}}$ (c) $\frac{2}{\sqrt{3}}$ (d) $-\frac{\sqrt{3}}{2}$ (e) $-\sqrt{5}$	Half Angle Identity.
If $\sin\theta = \frac{2\sqrt{2}}{3}, 0 < \theta < \frac{\pi}{2}$, then $\sin^2\frac{\theta}{2} =$ A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) $\frac{2}{3}$ D) 3 E) 2	Half Angle Identity.

If $\csc\theta = -\frac{5}{4}$, where $\frac{3\pi}{2} < \theta < 2\pi$, then $\sec\frac{\theta}{2} =$ A) $-\frac{\sqrt{5}}{2}$ B) $-\frac{\sqrt{5}}{5}$ C) $\frac{\sqrt{5}}{5}$ D) $-\frac{1}{2}$ E) $\frac{1}{2}$	Half Angle Identity.
$\cot\frac{x}{2} - \cos x \cot\frac{x}{2} =$ (a) $\sin x$ (b) $\cos x$ (c) $\tan x$ (d) $\cot x$ (e) $\csc x$	Half Angle Identity.
The exact value of $\tan(607.5°)$, is A) $\sqrt{2}+1$ B) $-\sqrt{3}-3$ C) $-\sqrt{2}+1$ D) $-\sqrt{2}-1$ E) $\sqrt{2}-1$	Half Angle Identity.

If $\cos(2\alpha) = \frac{7}{25}, 0 < \alpha < \frac{\pi}{2}$ and $\sin(2\beta) = -1,\ \frac{\pi}{2} < \beta < \pi$, then $\tan(\alpha - \beta) =$ A) 7 B) $\frac{1}{5}$ C) $-\frac{2}{5}$ D) 10 E) 5	Half Angle Identity.
If $0 \leq \theta < 2\pi, \cos\theta = \frac{4}{5}$ and $\sin\theta = \frac{-3}{5}$, then $\sec\left(\frac{\theta}{2}\right) =$ A) $\frac{\sqrt{10}}{3}$ B) $\frac{\sqrt{10}}{4}$ C) $-\frac{\sqrt{10}}{3}$ D) $-\frac{\sqrt{10}}{5}$ E) $-\frac{\sqrt{10}}{4}$	Half Angle Identity.
If $\tan x = -\frac{\sqrt{5}}{2}, \frac{3\pi}{2} < x < 2\pi$, then $\sin\frac{x}{2} =$ A) $\frac{\sqrt{6}}{6}$ B) $-\frac{\sqrt{6}}{6}$ C) $\sqrt{6}$ D) $-\sqrt{6}$ E) $2\sqrt{6}$	Half Angle Identity.

If $\csc\theta = -\frac{5}{4}$, where $\frac{3\pi}{2} < \theta < 2\pi$, then $\sec\frac{\theta}{2} =$ A) $-\frac{\sqrt{5}}{2}$ B) $-\frac{\sqrt{5}}{5}$ C) $\frac{\sqrt{5}}{5}$ D) $-\frac{1}{2}$ E) $\frac{1}{2}$	Half Angle Identity.
$(\sin 22.5° + \cos 22.5°)^2 =$ A) $\frac{2+\sqrt{2}}{2}$ B) 1 C) $\frac{\sqrt{2}}{2}$ D) $\frac{2-\sqrt{2}}{2}$ E) 2	Half Angle Identity.
$\cos\left(\frac{1}{2}\tan^{-1}\frac{3}{4}\right) =$ A) $\frac{3\sqrt{10}}{10}$ B) $\frac{2}{5}$ C) $\frac{3}{10}$ D) $\frac{\sqrt{10}}{10}$ E) $\frac{3}{5}$	Half Angle Identity.

By using the half angle identities $\cos\frac{3\pi}{8}$ is equal to A) $\frac{\sqrt{2-\sqrt{2}}}{2}$ B) $-\frac{\sqrt{2+\sqrt{3}}}{2}$ C) $\frac{\sqrt{2+\sqrt{3}}}{2}$ D) $-\frac{\sqrt{2\cdot\sqrt{2}}}{2}$ E) $\frac{\sqrt{2\cdot\sqrt{2}}}{2}$	Half Angle Identity.
If $\cos 2\theta = \frac{1}{2}$, where $\pi < \theta < \frac{3\pi}{2}$, then $\cot\theta =$ A) $\sqrt{3}$ B) $-\sqrt{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{\sqrt{2}}{3}$ E) $3\sqrt{2}$	Half Angle Identity.
$\sin^2\frac{x}{2} =$ A) $\frac{\tan x+\sin x}{\tan x}$ B) $\frac{1-\tan x\sin x}{2\tan x}$ C) $\frac{2\tan x-\sin x}{2\tan x}$ D) $\frac{2\tan x}{\tan x+\sin x}$ E) $\frac{\tan x-\sin x}{2\tan x}$	Half Angle Identity.

If $0 \leq \theta < 2\pi, \cos\theta = \frac{4}{5}$ and $\sin\theta = \frac{-3}{5}$, then $\sec\left(\frac{\theta}{2}\right) =$ A) $\frac{\sqrt{10}}{3}$ B) $\frac{\sqrt{10}}{4}$ C) $-\frac{\sqrt{10}}{3}$ D) $-\frac{\sqrt{10}}{5}$ E) $-\frac{\sqrt{10}}{4}$	Half Angle Identity.
$\frac{1-\cos 3x}{2}$ is identical to: A) $\sin^2 \frac{3x}{2}$ B) $\cos \frac{3x}{2}$ C) $\frac{1}{2}\sin \frac{3x}{2}$ D) $\cos^2 \frac{3x}{2}$ E) $\sin^2 6x$	Half Angle Identity.
$\sqrt{\frac{1-\sin\frac{17\pi}{5}}{2}} =$ A) $\sin \frac{9\pi}{20}$ B) $\cos \frac{11\pi}{20}$ C) $-\sin \frac{\pi}{10}$ D) $-\cos \frac{\pi}{10}$ E) $\cos \frac{\pi}{10}$	Half Angle Identity.

The exact value of $2\sin(382.5°) =$ A) $\sqrt{2-\sqrt{2}}$ B) $-\sqrt{2-\sqrt{2}}$ C) $-\sqrt{2+\sqrt{2}}$ D) $\sqrt{2+\sqrt{2}}$ E) $\sqrt{\sqrt{2}-2}$	Half Angle Identity.
The exact value of $\tan(247.5°)$ is A) $\sqrt{2}+1$ B) $\sqrt{2}-1$ C) $-\sqrt{2}+1$ D) $-\sqrt{2}-1$ E) $\sqrt{2}+2$	Half Angle Identity.
If $\tan\theta = -\frac{3}{4}, \frac{\pi}{2} < \theta < \pi$, then $\cos\left(\frac{\pi}{2} - \frac{\theta}{2}\right) =$ A) $\frac{2\sqrt{5}}{5}$ B) $-\frac{7}{25}$ C) $\frac{\sqrt{10}}{10}$ D) $-\frac{\sqrt{10}}{10}$ E) $\frac{3\sqrt{10}}{10}$	Half Angle Identity.

If $\sin\theta = -\frac{3}{5}$ and $\tan\theta > 0$, then $\tan\frac{\theta}{2} =$ A) -3 B) $-\frac{3}{2}$ C) $-\frac{4}{3}$ D) $-\frac{1}{3}$ E) $-\frac{3}{4}$	Half Angle Identity.
$\cos\left(\frac{1}{2}\tan^{-1}\frac{3}{4}\right) =$ A) $\frac{3\sqrt{10}}{10}$ B) $\frac{2}{5}$ C) $\frac{3}{10}$ D) $\frac{\sqrt{10}}{10}$ E) $\frac{3}{5}$	Half Angle Identity.
$\frac{2\tan x\cos^2 x - \tan x}{1 - \tan^2 x} =$ A) $\sin x\cos x$ B) $\cos^2 x$ C) $-\cot x\sin^2 x$ D) $\cot x\sin^2 x$ E) $-\sec x\csc^2 x$	Double Angle and Half Angle Identity.

The expression $\frac{\sin 2x-\sin x}{2\cos^2 x+\cos x-1}$ simplifies to (a) $\tan\frac{x}{2}$ (b) $\cot\frac{x}{2}$ (c) $\cos\frac{x}{2}$ (d) $\sin\frac{x}{2}$ (e) $\sec\frac{x}{2}$	Double Angle and Half Angle Identity.
$\frac{4\tan x}{1+\tan^2 x} =$ (a) $2\sin 2x$ (b) $2\cos 2x$ (c) $2\cot 2x$ (d) $2\sec 2x$ (e) $2\csc 2x$	Double Angle and Half Angle Identity.
If $\sin\theta = -\frac{4}{5}$, with $180° < \theta < 270°$, then $\cos\frac{\theta}{2} + \sin 2\theta =$ A) $\frac{24-5\sqrt{5}}{25}$ B) $\frac{5\sqrt{5}-24}{25}$ C) $-\frac{24+5\sqrt{5}}{25}$ D) $\frac{24+5\sqrt{5}}{25}$ E) $\frac{\sqrt{5}-8}{5}$	Double Angle and Half Angle Identity.

$\frac{1}{4} - \frac{1}{2}\sin^2 67.5° =$ A) $-\frac{\sqrt{2}}{8}$ B) $-\frac{\sqrt{3}}{8}$ C) $\frac{\sqrt{3}}{8}$ D) $\frac{\sqrt{2}}{8}$ E) $\frac{\sqrt{6}}{8}$	Double Angle and Half Angle Identity.
The exact value of $\sin 15°\left(8 - 16\sin^2(7.5°)\right)$ is equal to (a) 2 (b) 4 (c) 8 (d) $\frac{1}{2}$ (e) $\frac{1}{4}$	Double Angle and Half Angle Identity.
If $\left(\sin^2\frac{x}{4}\right)\left(\cos^2\frac{x}{4}\right) = a + b\cos x$, then $a \cdot b =$ A) $-\frac{1}{64}$ B) $-\frac{1}{36}$ C) $-\frac{1}{32}$ D) $-\frac{1}{48}$ E) $-\frac{1}{24}$	Double Angle and Half Angle Identity.

$\sqrt{\frac{1+\cos 110^\circ}{2}} =$ (a) $\sin 35^\circ$ (b) $\cos 65^\circ$ (c) $\sin 15^\circ$ (d) $-\cos 55^\circ$ (e) $\tan 55^\circ$	Double Angle and Half Angle Identity.
The value of $\frac{4\sin 15^\circ \cos 15^\circ}{(\cos 15^\circ+\sin 15^\circ)(\cos 15^\circ-\sin 15^\circ)}$ is A) $2\sqrt{3}+1$ B) $2\sqrt{2}$ C) $\sqrt{2}$ D) $2\sqrt{3}$ E) $\frac{2\sqrt{3}}{3}$	Double Angle Identities.
$\frac{\tan x}{\tan x+\cot x}-\frac{\cot x}{\cot x+\tan x}=$ A) $-\cos 2x$ B) $\sin 2x$ C) $-\tan 2x$ D) $\cot 2x$ E) $-\sec 2x$	Double Angle Identities.

$\cos\left(2\sin^{-1}\left(\frac{1}{4}\right)\right) =$ A) $\frac{7}{8}$ B) $\frac{8}{9}$ C) $\frac{5}{8}$ D) $\frac{3}{8}$ E) $\frac{1}{8}$	Double Angle Identities.
$9\sqrt{2}\sin\left(2\cos^{-1}\left(-\frac{1}{3}\right)\right) =$ A) -4 B) -6 C) 8 D) 6 E) -8	Double Angle Identities.
If $\cos 2\theta = \frac{7}{25}$ and $\frac{\pi}{2} < \theta < \pi$, then $\tan\theta =$ A) $-\frac{3}{4}$ B) $\frac{3}{4}$ C) $-\frac{4}{3}$ D) $-\frac{24}{25}$ E) $\frac{4}{3}$	Double Angle Identities.

$\cot\left[2\cos^{-1}\left(-\frac{4}{5}\right)\right] =$ A) $-\frac{7}{24}$ B) $\frac{24}{7}$ C) $\frac{5}{6}$ D) $-\frac{5}{12}$ E) $-\frac{7}{12}$	Double Angle Identities.
If $\sin 3x = A\sin^3 x + B\sin x$, then $A + B =$ A) -7 B) -1 C) 1 D) -2 E) 2	Double Angle Identities.
$\cos 3\alpha =$ A) $3\cos^3\alpha - \cos\alpha$ B) $2\cos^3\alpha - 4\cos\alpha$ C) $4\cos^3\alpha - 3\cos\alpha$ D) $3\cos^3\alpha + 4\cos\alpha$ E) $4\cos^3\alpha + \cos\alpha$	Double Angle Identities.

The exact value of $\tan\left[2\cos^{-1}\frac{1}{4}\right] =$ A) $-\frac{\sqrt{15}}{7}$ B) $\frac{\sqrt{15}}{4}$ C) $-\frac{\sqrt{13}}{7}$ D) $\frac{\sqrt{17}}{7}$ E) 34	Double Angle Identities.
$\cot\left[2\cos^{-1}\left(-\frac{4}{5}\right)\right] =$ A) $-\frac{7}{24}$ B) $-\frac{24}{25}$ C) $-\frac{5}{12}$ D) $\frac{24}{7}$ E) $\frac{7}{24}$	Double Angle Identities.
The value of $1-\cos^2(20°)-\cos^2(70°)$ is A) $\cos^2(90°)$ B) $\sin^2(90°)$ C) $\sin^2(70°)$ D) $1-\sin^2(20°)$ E) $\sin^2(20°)-\cos^2(20°)$	Double Angle Identities.

If $2\sin^{-1}\frac{3}{5} = 2\pi + \cos^{-1}x$, then $x =$ A) $\frac{7}{25}$ B) $-\frac{8}{5}$ C) $\frac{24}{25}$ D) $-\frac{13}{25}$ E) $-\frac{4}{5}$	Double Angle Identities.
$\frac{\tan\theta + \cot\theta}{\tan\theta - \cot\theta} =$ A) $-\sec 2\theta$ B) $-\csc 2\theta$ C) $\csc 2\theta$ D) $\cos 2\theta$ E) $\sec 2\theta$	Double Angle Identities.
$\sin\frac{9\pi}{8}\cos\frac{\pi}{8} =$ A) $-\frac{\sqrt{2}}{4}$ B) $-\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{2}}{8}$ D) $\frac{\sqrt{2}}{4}$ E) $\frac{\sqrt{2}}{2}$	Double Angle Identities.

If P is the period and A is the amplitude of the function $y = 2\sin \pi x \cos \pi x$, then A + P = A) 2 B) 0 C) 3 D) $\frac{3}{2}$ E) $1 + \sqrt{5}$	Double Angle Identities.
$\frac{\csc^2 x + \csc^4 x}{2 + \csc^2 x - \csc^4 x} =$ A) $-\sec 2x$ B) $\sec 2x$ C) $\csc 2x$ D) $-\csc 2x$ E) $\cot 2x$	Double Angle Identities.
$(\sin^\circ 15 + \cos^\circ 15)^2 + \frac{2\tan\frac{\pi}{3}}{1-\tan^2\frac{\pi}{3}}$ equals to A) $\frac{3-2\sqrt{3}}{2}$ B) $\frac{3+\sqrt{3}}{2}$ C) $\frac{3+2\sqrt{3}}{2}$ D) $-\frac{3+2\sqrt{3}}{2}$ E) $\frac{3-\sqrt{3}}{2}$	Double Angle Identities.

$3 - 8\sin^2(22.5°)\cos^2(22.5°) =$ A) 2 B) 0 C) 1 D) -1 E) -2	Double Angle Identities.
$\dfrac{\cot\frac{\pi}{12} - \tan\frac{\pi}{12}}{\cot\frac{\pi}{12} + \tan\frac{\pi}{12}} =$ A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{3}}{3}$ D) $\sqrt{3}$ E) $\frac{\sqrt{3}}{4}$	Double Angle Identities.
$\dfrac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} - \dfrac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} =$ A) $2\tan 2\theta$ B) $2\cot 2\theta$ C) $2\sec 2\theta$ D) $2\csc 2\theta$ E) $2\sin 2\theta$	Double Angle Identities.

$\tan\left(2\sin^{-1}\frac{2}{\sqrt{13}}\right) =$ A) $\frac{12}{5}$ B) $\frac{4}{3}$ C) $\frac{5}{12}$ D) $\frac{4}{5}$ E) $\frac{3}{5}$	Double Angle Identities.
If $\tan x = 3, \sin x < 0$, then $\sin 2x + \cos 2x =$ A) $-\frac{1}{5}$ B) $\frac{7}{5}$ C) $\frac{6}{5}$ D) $-\frac{4}{5}$ E) 1	Double Angle Identities.
$\frac{1}{2}\sin 15^{\circ}\sin 75^{\circ} =$ A) $\frac{1}{8}$ B) $-\frac{1}{4}$ C) $-\frac{\sqrt{3}}{2}$ D) $\frac{\sqrt{3}}{4}$ E) $\frac{\sqrt{3}}{8}$	Double Angle Identities.

If $p = \sin 165^{\circ} \cos 165^{\circ}$ and $q = \cos^2 \frac{\pi}{8} - \frac{1}{2}$ then $p + q =$ A) $\frac{\sqrt{2}-1}{4}$ B) $\frac{\sqrt{2}-1}{2}$ C) $\frac{\sqrt{2}}{4}$ D) $\frac{\sqrt{2}+1}{2}$ E) $\frac{1-\sqrt{2}}{2}$	Double Angle Identities.
If $\sin x = -\frac{3}{5}, \pi < x < \frac{3\pi}{2}$, then $48\cot 2x + 7\sec 2x =$ A) 39 B) -39 C) 11 D) -11 E) 32	Double Angle Identities.
If $\cos 2\theta = \frac{1}{2}$, where $\pi < \theta < \frac{3\pi}{2}$, then $\cot \theta =$ A) $\sqrt{3}$ B) $-\sqrt{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{\sqrt{2}}{3}$ E) $3\sqrt{2}$	Double Angle Identities.

The exact value of $\tan\left[2\cos^{-1}\frac{1}{4}\right] =$ A) $-\frac{\sqrt{15}}{7}$ B) $\frac{\sqrt{15}}{4}$ C) $-\frac{\sqrt{13}}{7}$ D) $\frac{\sqrt{17}}{7}$ E) 34	Double Angle Identities.
$\cot\left[2\cos^{-1}\left(-\frac{4}{5}\right)\right] =$ A) $-\frac{7}{24}$ B) $-\frac{24}{25}$ C) $-\frac{5}{12}$ D) $\frac{24}{7}$ E) $\frac{7}{24}$	Double Angle Identities.
Which one of the following equations is an identity? A) $\sin^4 x - \cos^4 x = -\cos 2x$ B) $\sin\frac{x}{2}\cos\frac{x}{2} = 2\sin x.$ C) $\tan^2 x - \sec^2 x = 1$ D) $\sec(x) + \sec(-x) = 0$ E) $\sin x = \sqrt{1-\cos^2 x}$	Trigonometric Identities.