Related angles

Choose the correct answer

1 $\tan 42° = \cdots$ Cot 48

(a) $\cot 42°$ (b) $\tan 48°$ (c) $\cot 48°$ (d) $\csc 48°$

Cot (90-42)

Choose the correct answer

90
S

$\cot(90^\circ + \theta) = -\tan\theta$

(a) $\tan(90^\circ - \theta)$ (b) $-\tan\theta$ (c) $\tan(90^\circ + \theta)$ (d) $\tan(270^\circ + \theta)$

Choose the correct answer

$\frac{\sec 105^\circ}{\csc 15^\circ} = \frac{\sec(90+15)}{\csc 15} = \frac{-\cancel{\csc 15}}{\cancel{\csc 15}} = -1 = \cot 135$

(a) $\frac{\sin 105^\circ}{\cos 15^\circ}$ (b) $\tan 135^\circ$ (c) $\cot 15^\circ$ (d) $\cos 90^\circ$

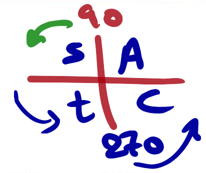
Choose the correct answer

$\tan(180° - \theta) =$ ...... $-\tan\theta$

180 S

(a) $\tan\theta$ (b) $-\tan\theta$ (c) $\cot\theta$ (d) $-\cot\theta$

Choose the correct answer



sec $(90^\circ + \theta) =$ …… $-\csc\theta$

(a) $\csc(180^\circ - \theta)$ → $\csc\theta$

(b) $\csc(180^\circ + \theta)$ → $-\csc\theta$

(c) $\csc(270^\circ - \theta)$ → $-\sec\theta$

(d) $\csc(270^\circ + \theta)$ → $-\sec\theta$

Choose the correct answer

$\cos(270° - \theta) =$ $-\sin\theta$

S | A
t | C
270

(a) $\sin\theta$ (b) $\cos\theta$ (c) $-\sin\theta$ (d) $-\cos\theta$

Choose the correct answer

If $\sin \theta = \frac{3}{5}$, then $\cos (270° - \theta) =$ $-\sin\theta = -\frac{3}{5}$ $\xleftarrow{\;}$ 270

(a) $\frac{3}{5}$ (b) $\frac{-3}{5}$ (c) $\frac{4}{5}$ (d) $\frac{-4}{5}$

Choose the correct answer

90 A

$\cos(90° - \theta) \times \csc\theta = \dots$ $\sin\theta \times \csc\theta = 1$

(a) zero (b) 1 (c) -1 (d) $\frac{-4}{5}$

math in use
BY MICHAEL GAMIL

Choose the correct answer

If $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\sin 70^\circ}{\sin 110^\circ} = k$, then k = ...

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

$180 \ \text{S}$

$1 + 1 = 2$

$\alpha + \beta = 90$

$\sin \alpha = \cos \beta$

$\alpha + \beta = 180$

$\alpha = 180 - \beta$

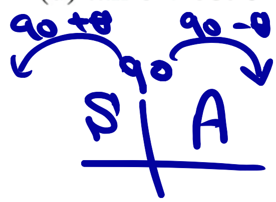
$\sin \alpha = \sin(180 - \beta)$

$\sin \alpha = \sin \beta$

Choose the correct answer

The simplest form of the expression : tan (90° – θ) + tan (90° + θ) is ....

(a) 2 cot θ (b) 2 tan θ (c) zero (d) tan θ + cot θ



$\tan(90-\theta) + \tan(90+\theta)$

$\cot\theta - \cot\theta = \text{zero}$

math in use BY MICHAEL GAMIL

Choose the correct answer

$\tan (45° + x) =$ .... $\cot (45 - x)$

(a) $\tan x$ (b) $-\tan x$ (c) $\tan (45° - x)$ (d) $\cot (45° - x)$

$90 - [45 + x]$

$90 - 45 - x$

$\cot (45 - x)$

$\tan \alpha = \cot \beta$

$\alpha + \beta = 90$

Choose the correct answer

$30 + \cancel{x} + 60 - \cancel{x} = 90^\circ$

$\frac{\sin(30^\circ + x)}{\cos(60^\circ - x)} = \dots 1 \dots$

(a) 1 (b) -1 (c) zero (d) $\tan x$

math in use BY MICHAEL GAMIL

Choose the correct answer

$45 + \cancel{x} + 45 - \cancel{x} = 90$

$\frac{\tan(45° + x)}{\cot(45° - x)} = \ldots\ldots 1$

(a) -1 (b) 1 (c) $\tan(90° + x)$ (d) $\cot(90° + x)$

math in use
BY MICHAEL GAMIL

Choose the correct answer

$\sin(90° - \theta)\sec(360° - \theta) - \cos(270° + \theta)\csc(180° + \theta) = \cdots\cdots\cdots$

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

90 S A 180 T C 360 270

$\cos\theta \times \sec\theta - \sin\theta \times -\csc\theta$

$1 + 1 = 2$

Choose the correct answer

If $A + B = 90°$, $\tan A = \frac{1}{3}$, then $\tan B =$ ....

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

$A + B = 90$

$\tan A = \cot B$

$\cot B = \frac{1}{3} \Rightarrow \tan B = 3$

Choose the correct answer

If $x + y = \frac{\pi}{2}$, then $\frac{\sin x - \sin y}{\cos x - \cos y} = \frac{\cos y - \cos x}{\cos x - \cos y} = \frac{-(\cancel{\cos x - \cos y})}{\cancel{\cos x - \cos y}} = -1$

(a) -1 (b) zero (c) 1 (d) 2

$x + y = 90$

$\sin x = \cos y$

$\sin y = \cos x$

Choose the correct answer

180 4th

$\cos \theta + \cos (180° - \theta) = \cdots\cdots\cdots$

(a) zero (b) 1 (c) $2 \cos \theta$ (d) $\cos \theta$

$\cos \theta - \cos \theta = \text{Zero}$

Choose the correct answer

$\sin\theta + \cos(270° + \theta) = \cdots\cdots\cdots$

Bod

$+_c$
270

(a) zero (b) 1 (c) $2\sin\theta$ (d) $\sin\theta\cos\theta$

$\sin\theta + \sin\theta = 2\sin\theta$

Choose the correct answer

The simplest form of the expression :

$\sin(180° - \theta) + \cos(-60°) + \cos(90° + \theta) + \sin(-150°) = \cdots\cdots\cdots$

(a) zero (b) 1 (c) – 1 (d) 2 sin θ

180 90 S

$\cancel{\sin\theta} + \cos 60 - \cancel{\sin\theta} + \sin 210$

$\frac{1}{2} - \frac{1}{2} = \text{zero}$

$\sin 210 = \sin(180 + 30)$

$= -\sin 30$

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

math in use
BY MICHAEL GAMIL

Choose the correct answer

If cos θ = – sin 2 θ , θ is the smallest positive measure , then θ = ...°

(a) 60 (b) 150 (c) 90 (d) 330

Cos 60 = -Sin 120 Cos 150 = -Sin 300 Cos 90 = -Sin 180 Cos 330

$\frac{1}{2} = -\frac{\sqrt{3}}{2}$ $-\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$ = -Sin 300

$\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$

Choose the correct answer

$\frac{S \mid A}{T \mid C}$

If $\sqrt{3}\csc\theta = -2$ where θ is the smallest positive angle, then $= \theta$ ....

(a) 60° (b) 120° (c) 300° (d) 240°

$\csc\theta = -\frac{2}{\sqrt{3}}$

$\sin\theta = -\frac{\sqrt{3}}{2}$

$3^{rd}: 180 + \overset{60}{\theta} = 240$

$4^{th}: 360 - \overset{60}{\theta} = 300$

Choose the correct answer

S/A
T/C

If $\cos\theta = \frac{-1}{2}$, θ is measure of the smallest positive angle , then θ = ...

(a) 60° (b) 120° (c) 240° (d) 300°

$\cos\theta = -\frac{1}{2}$

$2^{nd}: 180 - \overset{60}{\theta} = 120°$

$3^{rd}: 180 + \overset{60}{\theta} = 240$

Choose the correct answer

If $\cos(270° - \theta) = \frac{1}{2}$ where θ is the measure of the smallest positive angle , then $\theta = \dots\dots\dots$

(a) $30°$ (b) $150°$ (c) $210°$ (d) $330°$

$-\sin\theta = \frac{1}{2}$

$\sin\theta = -\frac{1}{2}$

3rd : $180 + 30 = 210°$

4th : $360 - 30 = 330°$

math in use
BY MICHAEL GAMIL

Choose the correct answer

If $\cos(90° + \theta) = \frac{\sqrt{3}}{2}$ where θ is the smallest positive angle , then $\theta =$ ....

(a) 150° (b) 240° (c) 210° (d) 330°

180 90 360

$-\sin\theta = \frac{\sqrt{3}}{2}$

$\sin\theta = -\frac{\sqrt{3}}{2}$

3^{rd} : $180 + 60 = 240$

4^{th} : $360 - 60 = 300$

Choose the correct answer

If $\tan\theta = \tan(90 - \theta)$ where θ is an acute angle , then $\theta =$ ....°

(a) 15 (b) 30 (c) 45 (d) 60

$\tan\theta = \cot\theta$

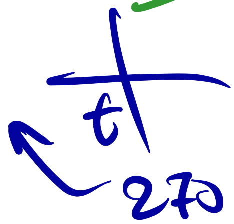
$\theta + \theta = 90°$

$2\theta = 90° \Longrightarrow \theta = 45°$

Choose the correct answer

If $\cos(990° - \theta) = \frac{1}{2}$ where θ is measure of the smallest positive angle , then $\theta =$ ....

(a) 30° (b) 150° (c) 210° (d) 330°



$\cos(270 - \theta) = \frac{1}{2}$

$-\sin\theta = \frac{1}{2}$

$\sin\theta = -\frac{1}{2}$

$3^{rd}: 180 + 30 = 210°$

$4^{th}: 360 - 30 = 330$

Choose the correct answer

3rd

If $2\cos\theta + \sqrt{3} = 0$ where $180° < \theta < 270°$, then $\theta =$ ....

180 270

(a) 150° (b) 240° (c) 210° (d) 300°

$2\cos\theta = -\sqrt{3}$

$\cos\theta = -\frac{\sqrt{3}}{2}$

$2^{nd}: 180 - \theta$ (ref.)

$3^{rd}: 180 + \overset{30}{\theta} = 210°$

Choose the correct answer

If 5 sin $x = 3$, then sec $(270° + x) =$ .... $\csc x = \frac{1}{\sin x}$ $+ ty$ 270

(a) $\frac{5}{3}$ (b) $\frac{-5}{4}$ (c) $\frac{-5}{3}$ (d) $\frac{5}{4}$

$\sin x = \frac{3}{5}$ $\Rightarrow$ $\csc x = \frac{5}{3}$

Choose the correct answer

If $\sin\theta = -\frac{1}{2}$, $\overset{+ve}{\tan\theta > 0}$, then $\theta =$ ....

(a) 30°   (b) 150°   (c) 210°   (d) 330°

$\sin\theta = -\frac{1}{2}$

$\boxed{3^{rd}}$: $180 + \overset{30}{\theta} = 210°$

~~4^{th}: $360 - \theta$~~

ref.

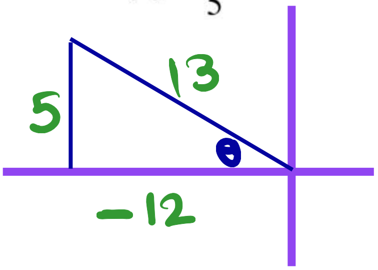
Choose the correct answer

If $\tan\theta = \frac{-5}{12}$, $\cos\theta < 0$, then $\csc\theta = \dots\dots$ $\frac{13}{5}$

-ve

(a) $\frac{5}{13}$ (b) $\frac{-5}{13}$ (c) $\frac{13}{5}$ (d) $\frac{-13}{5}$

$\tan\theta = -\frac{5}{12}$ → 2^{nd} : (Sin) ; 4^{th} : (Cos) (ref.)



$\sin\theta = \frac{5}{13}$

Choose the correct answer

1^{st} quad

If 2 sin (90° – θ) = 1 , where $\boxed{0 < \theta < \frac{\pi}{2}}$, then θ = ...

(a) 90° (b) 60° (c) 30° (d) 45°

$2 \cos\theta = 1$

$\cos\theta = \frac{1}{2}$

$1^{st}: \theta \Rightarrow \theta = \cos^{-1}\left(\frac{1}{2}\right) = 60°$

$\cancel{4^{th}: 360 - \theta}$

Choose the correct answer

If $5 \cos (90° - \theta) = 4$, $0° < \theta < 90°$, then $\sin \theta = \cdots\cdots\cdots$

(a) $\frac{5}{4}$ (b) $\frac{-3}{5}$ (c) $\frac{4}{5}$ (d) $\frac{3}{5}$

$5 \sin\theta = 4$

$\sin\theta = \frac{4}{5}$

Choose the correct answer

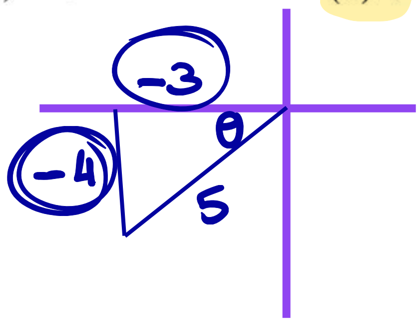
→ 3rd

$+$
270

If $\sin\theta = -0.8$ where $180° < \theta < 270°$, then $3\cot(270 - \theta) = \cdots\cdots\cdots$

(a) -3 (b) 3 (c) -4 (d) 4

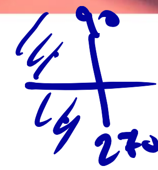
$\sin\theta = -\frac{4}{5}$



$3\cot(270 - \theta)$

$3\tan\theta = \cancel{3} \times \frac{\cancel{-}4}{\cancel{-3}} = 4$

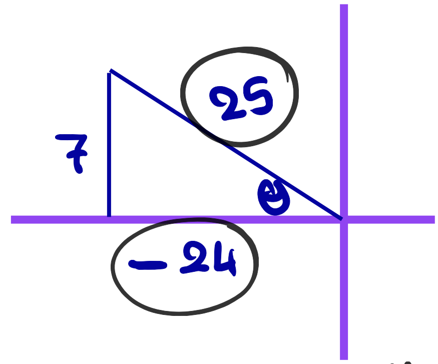
Choose the correct answer



If $24 \tan \theta + 7 = 0$, $90° < \theta < 270°$, then $\sec (1080° + \theta) =$ ....

(a) $\frac{24}{7}$ (b) $\frac{-24}{7}$ (c) $\frac{25}{24}$ (d) $\frac{-25}{24}$

$\tan\theta = -\frac{7}{24}$ → 2nd, ~~4th~~



$$\sec(1080 + \theta) = \sec\theta$$

$$= \frac{1}{\cos\theta} = -\frac{25}{24}$$

$$\cos\theta = -\frac{24}{25}$$

Choose the correct answer

If $13 \sin (90° - \theta) = 5$, then $\cos \theta =$ ....

(a) $\frac{12}{13}$ (b) $\frac{-12}{13}$ (c) $\frac{5}{13}$ (d) $\frac{-5}{13}$

$13 \cos \theta = 5$

$\cos \theta = \frac{5}{13}$

math in use BY MICHAEL GAMIL

Choose the correct answer

If cot (90° + θ) + 1 = 0 where 0° < θ < 90° , then cos 4 θ = ……….

(a) $\frac{1}{2}$ (b) 1 (c) zero (d) – 1

90

8

$-\tan\theta + 1 = 0$

$-\tan\theta = -1$

$\theta = \tan^{-1}(1) = 45°$

1st

$\tan\theta = 1$

3rd

$\cos 4\theta = \cos 180 = -1$

Choose the correct answer

$2\theta \in]0, \frac{\pi}{2}[$

If $\cos(90° + \theta) + \sin(90° - 2\theta) = 0$, where $\theta \in]0, \frac{\pi}{4}[$, then $\sin 2\theta =$ ....

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

$-\sin\theta + \cos 2\theta = 0$

$\cos 2\theta = \sin\theta$

$2\theta + \theta = 90$

$3\theta = 90 \Longrightarrow \theta = \frac{90}{3} = 30°$

$\sin 2\theta = \sin 60 = \frac{\sqrt{3}}{2}$

Choose the correct answer

$2\theta \in]0, \frac{\pi}{2}[$

If $\cot(90° + \theta) + \tan(90° - 2\theta) = 0$, where $\theta \in \left]0, \frac{\pi}{4}\right[$, then $\tan 2\theta =$ ....

(a) $\frac{1}{\sqrt{3}}$ (b) 1 (c) zero (d) $\sqrt{3}$

$-\tan\theta + \cot 2\theta = 0$

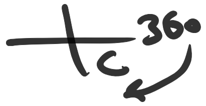
$\cot 2\theta = \tan\theta$

$2\theta + \theta = 90$

$3\theta = 90 \Longrightarrow \theta = 30°$

$\tan 2\theta = \tan 60 = \sqrt{3}$

Choose the correct answer

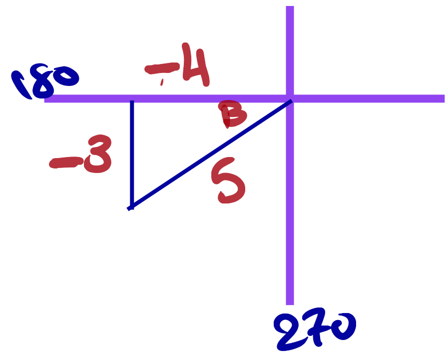


If $\tan B = \frac{3}{4}$ where $\pi < B < \frac{3\pi}{2}$, then $\cos(360° - B) - \cos(90° - B) =$ ....

(a) $\frac{-7}{5}$ (b) $\frac{-3}{5}$ (c) $\frac{-4}{5}$ (d) $\frac{-1}{5}$

$\cos B - \sin B$

$\frac{-4}{5} - \frac{-3}{5} = -\frac{1}{5}$



Choose the correct answer

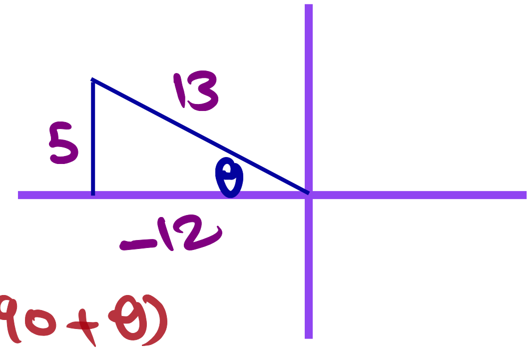
If $13 \sin \theta - 5 = 0$, where $\theta \in]\frac{\pi}{2} , \pi[$, then the value of $\sin (270° - \theta) \times \sec (90 + \theta)$

= ....

(a) $\frac{-12}{5}$ (b) $\frac{12}{5}$ (c) $\frac{5}{12}$ (d) $\frac{-5}{12}$

$13 \sin \theta = 5$

$\sin \theta = \frac{5}{13}$



$\sin (270 - \theta) \times \sec (90 + \theta)$

$-\cos \theta \times -\csc \theta$

$\cancel{+}\left(-\frac{12}{\cancel{13}}\right) \times \cancel{+}\frac{\cancel{13}}{5} = -\frac{12}{5}$

Choose the correct answer

$(-,+)$

If the terminal side of an angle whose measure is θ in standard position intersects the unit circle at the point $\left(\frac{-\sqrt{3}}{2}, y\right)$ where $y \in \mathbb{R}^+$, then $\theta =$ ....

(a) 30° (b) 150° (c) 210° (d) 330°

$x^2 + y^2 = 1$

$\frac{3}{4} + y^2 = 1$

$y^2 = 1 - \frac{3}{4}$

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

$y = \frac{1}{2}$ $y = -\frac{1}{2}$ (ref.)

$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$\cos\theta$ $\sin\theta$

Choose the correct answer

If $\left(x , \frac{1}{2}\right)$ is the intersection point of the terminal side of a directed angle in the standard position with the unit circle where $90° < \theta < 180°$

, then $\sin(90° - \theta) \tan\theta = \cdots\cdots\cdots$

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) $\frac{1}{3}$ (d) -3

$$x^2 + \frac{1}{4} = 1$$

$$x^2 = 1 - \frac{1}{4}$$

$$x^2 = \frac{3}{4}$$

$$x = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$$

$x = \frac{\sqrt{3}}{2}$ (ref.) $\qquad x = -\frac{\sqrt{3}}{2}$ (acc.)

$$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right) \rightarrow \tan\theta = \frac{y}{x} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$$

x, y; $\cos\theta$, $\sin\theta$

$\sin(90 - \theta) \times \tan\theta$

$\cancel{\cos\theta} \times \frac{\sin\theta}{\cancel{\cos\theta}} = \sin\theta = y = \frac{1}{2}$

$$\sin(90 - \theta) \times \tan\theta$$

$$\cos\theta \times \tan\theta$$

$$\cancel{-}\frac{\cancel{\sqrt{3}}}{2} \times \cancel{-}\frac{1}{\cancel{\sqrt{3}}} = \frac{1}{2}$$

Choose the correct answer

If θ is the measure of an angle in standard position and its terminal side intersects the unit circle at $(x, -x)$ where $x > 0$, then $\theta = \ldots\ldots\ldots^\circ$

(a) 45 (b) 135 (c) 225 (d) 315

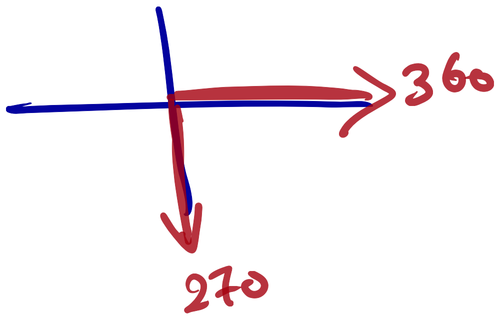
$x^2 + (-x)^2 = 1$

$x^2 + x^2 = 1$

$2x^2 = 1$

$x^2 = \frac{1}{2}$

$x = \frac{1}{\sqrt{2}}$ $x = -\frac{1}{\sqrt{2}}$ (ref.)



$P. \left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right) \in$ 4th quad $360 - \theta$

$x = \cos\theta = \frac{1}{\sqrt{2}} \Rightarrow \theta = \cos^{-1}\left(\frac{1}{\sqrt{2}}\right) = 45^\circ$

4th: $360 - 45 = 315^\circ$

Choose the correct answer (−, +)

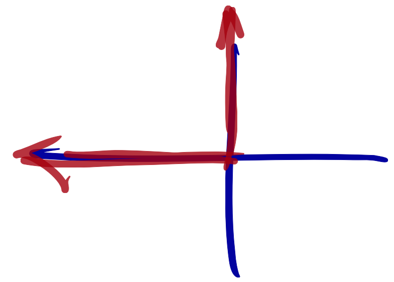
If the terminal side of an angle whose measure is θ in its standard position intersects the unit circle at the point $\left(\frac{-3}{5}, \frac{4}{5}\right)$, then $\csc\left(\frac{3\pi}{2} - \theta\right) = \dots\dots\dots$

(a) $\frac{5}{3}$ (b) $\frac{-5}{3}$ (c) $\frac{5}{4}$ (d) $\frac{-5}{3}$

$\csc(270 - \theta) = -\sec\theta$

$= -\frac{1}{\cos\theta} = -\frac{1}{x} = \cancel{+}\frac{5}{\cancel{-}3}$

$= \frac{5}{3}$



Choose the correct answer

$90-\theta$, θ

If the terminal side of the directed angle $(90° - \theta)$ in the standard position intersect the unit circle at the point $\left(\frac{-4}{5}, \frac{3}{5}\right)$, then $\sin\theta = \dots\dots\dots$

(a) $\frac{-4}{5}$ (b) $\frac{4}{5}$ (c) $\frac{-3}{5}$ (d) $\frac{3}{5}$

$x = \cos(90-\theta) = \frac{-4}{5} \Rightarrow \sin\theta = -\frac{4}{5}$

$y = \sin(90-\theta) = \frac{3}{5} \Rightarrow \cos\theta = \frac{3}{5}$

Choose the correct answer

If $\sin \propto = \cos \beta$, then $\csc(\propto + \beta) = \dots\dots\dots$ csc 90 = 1

(a) 1 (b) -1 (c) $\frac{1}{\sqrt{3}}$ (d) undefined.

Choose the correct answer

$\tan 90 = \text{undefined} = \frac{1}{\text{zero}}$

If $\sin \propto = \cos \beta$, then $\cot (\propto + \beta) =$ ....

90

(a) 1 (b) – 1 (c) zero (d) undefined.

$$\cot 90 = \frac{1}{\tan 90} = \frac{\text{zero}}{1} = \text{zero}$$

Choose the correct answer

If $\sin\theta = \cos 2\theta$, $\theta \in]0, \frac{\pi}{2}[$, then $\sin 3\theta =$ ...... $\sin 90 = 1$

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

$\theta + 2\theta = 90$

$\boxed{3\theta = 90}$

Choose the correct answer

If $\sin 2\theta = \cos 4\theta$ where θ is a positive acute angle

, then $\tan (90° - 3\theta) =$ ....

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

$2\theta + 4\theta = 90$

$6\theta = 90$

$\theta = \frac{90}{6} = 15°$

$\tan (90 - 3\theta)$

$\tan (90 - 45)$

$\tan 45 = 1$

or $\tan (90 - 3\theta)$

$= \cot 3\theta$

$= \cot 45 = 1$

Choose the correct answer

If $\tan\theta = \cot 2\theta$, $0° < \theta < 90°$, then $\sin\theta + \cos 2\theta = \dots\dots\dots$

(a) 1 (b) – 1 (c) 2 (d) $\frac{1}{4}$

$\theta + 2\theta = 90$

$3\theta = 90$

$\boxed{\theta = 30°}$

$\sin\theta + \cos 2\theta$

$\sin 30 + \cos 60$

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

Choose the correct answer

If $\sin(\theta + 13°) = \cos(\theta + 17°)$ where θ is a positive acute angle , then $\tan\theta =$ ....

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

$\theta + 13 + \theta + 17 = 90°$

$2\theta + 30 = 90$

$2\theta = 90 - 30$

$2\theta = 60$

$\theta = 30°$

$\tan\theta = \tan 30$

$= \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$

math in use BY MICHAEL GAMIL

Choose the correct answer

If $\cos \frac{20+\theta}{2} = \sin \frac{40+\theta}{2}$, $0° < \theta < 90°$, then $\theta =$ ....

(a) 20° (b) 30° (c) 45° (d) 60°

$$\frac{20+\theta}{2} + \frac{40+\theta}{2} = 90$$

$$\frac{20+\theta+40+\theta}{2} = 90$$

$$\frac{2\theta+60}{2} = 90$$

$$2\theta + 60 = 180$$

$$2\theta = 120 \Rightarrow \boxed{\theta = 60°}$$

Choose the correct answer

$\alpha + \beta = \frac{\pi}{2} + \pi n$

The general solution of the equation $\tan 2\theta = \cot \theta$ is ....

(a) $\frac{\pi}{2} + \pi n$ (b) $\frac{\pi}{6} + \frac{\pi}{3} n$ (c) $\frac{\pi}{6} + 2\pi n$ (d) $\frac{\pi}{6} + \pi n$

$$2\theta + \theta = \frac{\pi}{2} + \pi n$$

$$3\theta = \frac{\pi}{2} + \pi n \quad (\div 3)$$

$$\boxed{\theta = \frac{\pi}{6} + \frac{\pi}{3} n}$$

Choose the correct answer

For every n $\in \mathbb{Z}$, the general solution of the equation : $\tan 2\theta = \cot 4\theta$ is ....

(a) $15° + 360° n$ (b) $90° + 180° n$ (c) $15° + 30° n$ (d) $30° + 180° n$

$2\theta + 4\theta = 90 + 180n$

$6\theta = 90 + 180n$ $(\div 6)$

$\boxed{\theta = 15 + 30n}$

Choose the correct answer

$\alpha \pm \beta = 90 + 360n$

For every $n \in \mathbb{Z}$, the general solution of the equation : $\csc \theta = \sec (30° + \theta)$ is ....

(a) $60° + 180° n$ (b) $30° + 360° n$ (c) $60° + 360° n$ (d) $30° + 180° n$

$\theta + 30 + \theta = 90 + 360n$

$2\theta + 30 = 90 + 360n$

$2\theta = 60 + 360n \quad (\div 2)$

$\boxed{\theta = 30 + 180n}$

Choose the correct answer

If ABCD is a cyclic quadrilateral and $\sin A = \frac{3}{5}$, then $\sin C = \dots\dots\dots$

(a) $\frac{3}{5}$ (b) $-\frac{3}{5}$ (c) $\frac{4}{5}$ (d) $-\frac{4}{5}$

$A + C = 180$

$C = 180 - A$

$\sin C = \sin(180 - A)$

$\sin C = \sin A = \frac{3}{5}$

Choose the correct answer

$-\cos Z$

If XYZL is a cyclic quadrilateral , $\cos X = \frac{1}{2}$ then $\sin(270° - Z) =$ ....

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

$$X + Z = 180°$$

$$Z = 180 - X$$

$$\cos Z = \cos(180 - X)$$

$$\cos Z = -\cos X$$

$$-\cos Z = \cos X = \frac{1}{2}$$

Choose the correct answer

In a right-angled triangle and one of its angles is $x°$, if $\sin x = \frac{4}{5}$, then $\cos(90 - x°) =$ .... $\sin x = \frac{4}{5}$

(a) $\frac{3}{5}$ (b) $\frac{-3}{5}$ (c) $\frac{-4}{5}$ (d) $\frac{4}{5}$

Choose the correct answer

If Δ ABC is an obtuse-angled triangle at A , $\sin A = \frac{4}{5}$

, then $\sin(2A + B + C) =$ ....

(a) $\frac{3}{5}$ (b) $\frac{-3}{5}$ (c) $\frac{-4}{5}$ (d) $\frac{4}{5}$

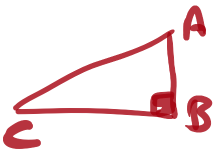
$$\sin(A + \underbrace{A + B + C}_{180}) = \sin(180 + A)$$

$$= -\sin A = -\frac{4}{5}$$

Choose the correct answer

ABC is a right-angled triangle at B , if $\boxed{\cos A = \frac{1}{2}}$, then the value of $\sin(A + B + 2C) = \cdots\cdots\cdots$

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) zero



$\sin(A+B+C+C) = \sin(180+C)$

$= -\sin C$

$= \cos A = \frac{1}{2}$

$A + C = 90$

$\cos A = \underline{-\sin C}$

Choose the correct answer

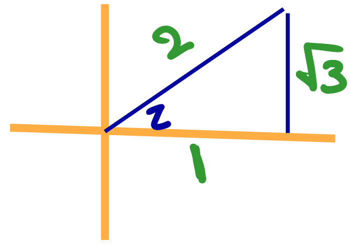
If XYZ is an acute-angled triangle and tan Z $=\sqrt{3}$, then sin $(x + y + 2z) =$ ....

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

$\sin(x+y+z+z) = \sin(180+z)$

$= -\sin z$

$= -\frac{\sqrt{3}}{2}$



Choose the correct answer

$\cos A - \cos A$

If ABC is an acute-angled triangle , then cos A + cos (B + C) = ... Zero

(a) – 1 (b) zero (c) 1 (d) $\frac{1}{2}$

$A + B + C = 180$

$B + C = 180 - A$

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

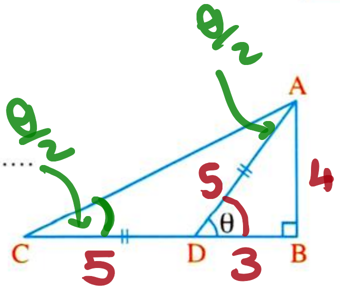
$\cos(B+C) = -\cos A$

Choose the correct answer

In the opposite figure :

If $D \in \overline{BC}$, $AD = DC$, $\sin\theta = \frac{4}{5}$, then $\cot\left(270° - \frac{\theta}{2}\right) =$ ....

(a) $\frac{3}{4}$ (b) $\frac{1}{2}$ (c) 2 (d) $\frac{2}{3}$



$$\cot\left(270 - \frac{\theta}{2}\right)$$

$$= \tan\frac{\theta}{2} = \tan C = \frac{AB}{BC} = \frac{4}{8} = \frac{1}{2}$$

Choose the correct answer

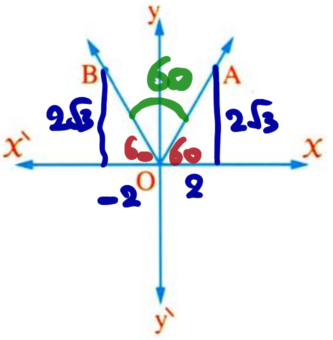
In the opposite figure :

If $A = \left(2, 2\sqrt{3}\right)$, $B = \left(-2, 2\sqrt{3}\right)$

, then $\cot\left(180^\circ - m(\angle AOB)\right) = \cdots\cdots\cdots$

(a) 1 (b) $\frac{1}{2}$

(c) $\frac{-1}{\sqrt{3}}$ (d) $\sqrt{3}$



$\cot(180 - 60)$

$-\cot 60 = -\frac{1}{\tan 60} = -\frac{\sqrt{3}}{3}$

$= -\frac{1}{\sqrt{3}}$

$\tan\theta = \frac{2\sqrt{3}}{2} = \sqrt{3}$

$\theta = \tan^{-1}\sqrt{3} = 60$

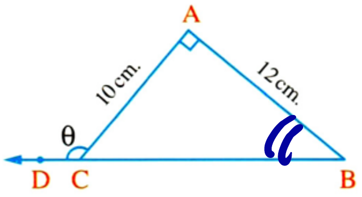
Choose the correct answer

In the opposite figure :

$D \in \overrightarrow{BC}$, AC = 10 cm. , AB = 12 cm. , then $\cot \theta =$ ………

(a) $\frac{6}{5}$ (b) $-\frac{6}{5}$

(c) $\frac{5}{6}$ (d) $-\frac{5}{6}$



$\theta = A + B \Rightarrow \theta = 90 + B$

$\cot \theta = \cot(90 + B)$

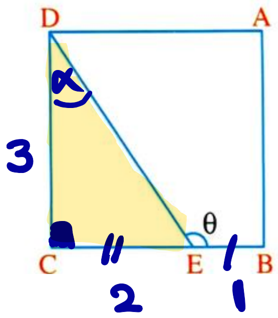
$\cot \theta = -\tan B$

$\cot \theta = -\frac{10}{12} = -\frac{5}{6}$

Choose the correct answer

In the opposite figure :

ABCD is a square , CE = 2 BE , then tan θ = ...



(a) $-\frac{3}{2}$ (b) $-\frac{2}{3}$

(c) $\frac{1}{2}$ (d) $\frac{2}{3}$

$$\theta = 90 + \alpha$$

$$\tan\theta = \tan(90+\alpha)$$

$$\tan\theta = -\cot\alpha$$

$$\tan\theta = -\frac{3}{2}$$

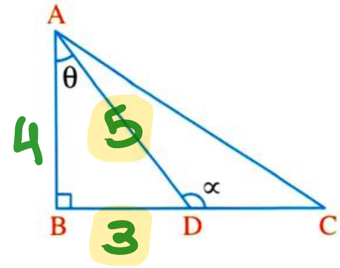
math in use
BY MICHAEL GAMIL

Choose the correct answer

In the opposite figure :

Δ ABC is a right-angled triangle at B , $\tan\theta = \frac{3}{4}$,

then $\cos\alpha =$ ....



(a) $\frac{3}{4}$ (b) $-\frac{3}{4}$

(c) $-\frac{4}{5}$ (d) $-\frac{3}{5}$

$\alpha = 90 + \theta$

$\cos\alpha = \cos(90 + \theta)$

$\cos\alpha = -\sin\theta$

$\cos\alpha = -\frac{3}{5}$

Choose the correct answer

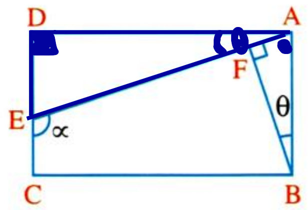
$\bullet + \theta = 90$

$\bullet + \theta = 90$

In the opposite figure :

ABCD is a rectangle , $\tan\theta = \frac{1}{3}$, $\overline{BF} \perp \overline{AE}$,

then $\cot\alpha = \cdots\cdots\cdots$



(a) $\frac{1}{3}$ (b) $\frac{3}{4}$

(c) $-\frac{1}{3}$ (d) $\frac{2}{3}$

$\alpha = 90 + \theta$

$\cot\alpha = \cot(90+\theta)$

$\cot\alpha = -\tan\theta = -\frac{1}{3}$

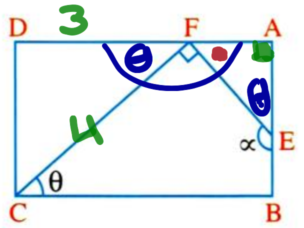
Choose the correct answer

$\bullet + \theta = 90$

In the opposite figure :

ABCD is a rectangle , $\cos\theta = \frac{3}{4}$, $\overline{EF} \perp \overline{FC}$,

then $\cos\alpha =$ ....



(a) $\frac{3}{5}$

(b) $-\frac{4}{5}$

(c) $-\frac{3}{4}$

(d) $\frac{3}{4}$

$\alpha + \theta = 180$

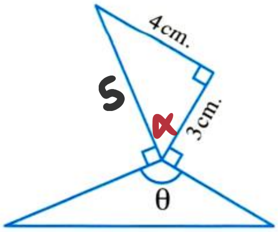
$\alpha = 180 - \theta$

$\cos\alpha = \cos(180 - \theta)$

$\cos\alpha = -\cos\theta = -\frac{3}{4}$

Choose the correct answer

In the opposite figure :



$\cos\theta = \cdots\cdots\cdots$

(a) $\frac{3}{5}$ (b) $-\frac{3}{5}$

(c) $-\frac{4}{3}$ (d) $-\frac{4}{5}$

$\alpha + \theta = 180°$

$\theta = 180 - \alpha$

$\cos\theta = \cos(180 - \alpha)$

$\cos\theta = -\cos\alpha$

$\cos\theta = -\frac{3}{5}$

math in use
BY MICHAEL GAMIL

Choose the correct answer

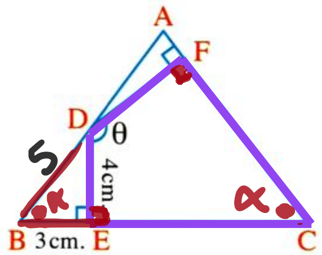
In the opposite figure :

ABC is an isosceles triangle in which

$AB = AC$, $D \in \overline{AB}$, $\overline{DE} \perp \overline{BC}$, $\overline{DF} \perp \overline{AC}$

, $m(\angle EDF) = \theta$, $DE = 4$ cm. , $BE = 3$ cm.

, then $\cos\theta =$ ....



(a) $\frac{3}{5}$ (b) $-\frac{3}{5}$ (c) $-\frac{4}{5}$ (d) $\frac{4}{5}$

$\alpha + \theta = 180$

$\theta = 180 - \alpha$

$\cos\theta = \cos(180 - \alpha)$

$\cos\theta = -\cos\alpha$

$\cos\theta = -\frac{3}{5}$

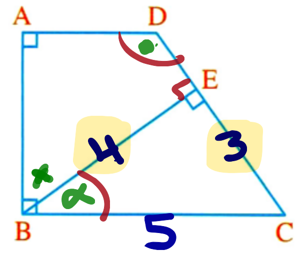
Choose the correct answer

$\bullet + x = 180$

In the opposite figure :

If 3 BE = 4 CE $\Rightarrow \dfrac{BE}{CE} = \dfrac{4}{3}$

, then tan (∠ ADC) = ………



(a) $\frac{4}{3}$ (b) $-\frac{4}{3}$

(c) $\frac{3}{4}$ (d) $-\frac{3}{4}$

$\alpha + x = 90$

$\bullet + x = 180$

$x = 180 - \bullet$

$\alpha + 180 - \bullet = 90$

$\alpha + 180 - 90 = \bullet$

$\bullet = 90 + \alpha$

$\tan \bullet = \tan(90 + \alpha)$

$\tan \bullet = -\cot \alpha$

$= -\frac{4}{3}$

Choose the correct answer

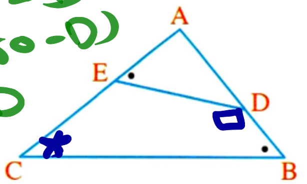
$C + D = 180$

$C = 180 - D$

$\cos C = \cos(180 - D)$

$\cos C = -\cos D$

In the opposite figure :



m (∠ AED) = m (∠ B)

$-\cos C$

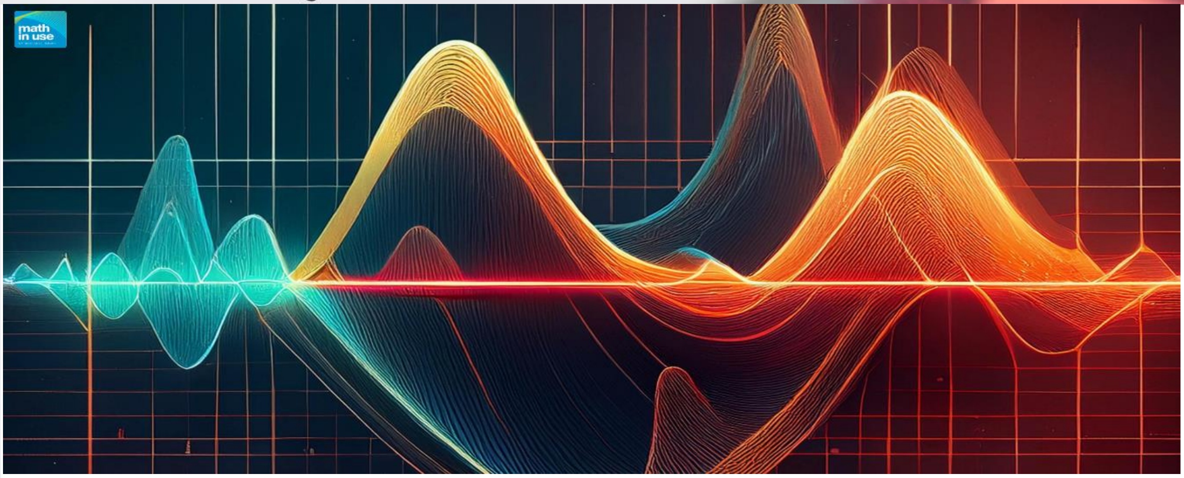
, then cos C + cos (∠ BDE) = ...

(a) 1 (b) – 1 (c) π (d) zero

$★ + \square = 180$

$★ = 180 - \square$

$\cos ★ = -\cos \square$



Exercise 8

Graphing trigonometric functions

Choose the correct answer

The range of the function $f : f(\theta) = \sin\theta$ is ....

(a) $\{-1 , 1\}$ (b) $[-1 , 1]$ (c) $]-1 , 1[$ (d) $]-\infty , \infty[$

Choose the correct answer

If $f(\theta) = \cos 5\theta$, then the range of the function is ....

(a) $\{-5 , 5\}$ (b) $[-1 , 1]$ (c) $]-5 , 5[$ (d) $[-5 , 5]$

Choose the correct answer

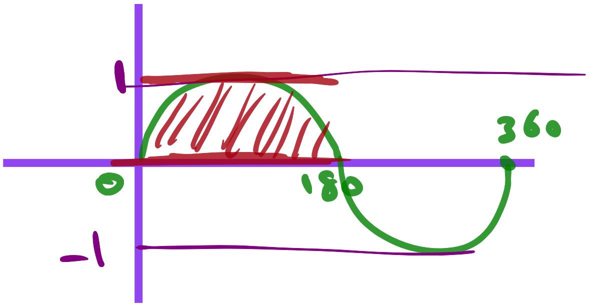
The range of the function $f : f(\theta) = 4 \sin 2\theta$ where $\theta \in [0, 2\pi]$ equal ....

(a) $[-4, 4]$ (b) $]-4, 4[$ (c) $[-2, 2]$ (d) $]-2, 2[$

Choose the correct answer

If $f(\theta) = \sin\theta$, $\theta \in [0 , \pi[$, then the range of f is ………

(a) $[-1 , 1]$ (b) $[0 , 1]$ (c) $[-1 , 0]$ (d) $\mathbb{R}$



Choose the correct answer

The range of the function $f : f(X) = \frac{\cos X}{5}$ where $X \in \mathbb{R}$ is ....

(a) $[-\frac{1}{5}, \frac{1}{5}]$ (b) $[-1, 1]$ (c) $[-5, 5]$ (d) $[0, \frac{2}{5}]$

$f(x) = \frac{1}{5} \cos x$

$[-\frac{1}{5}, \frac{1}{5}]$

Choose the correct answer

If the range of the function $f : f(\theta) = 2\,a \sin\theta$ is $[-6 , 6]$, then a = ...

(a) 3 (b) – 3 (c) 6 (d) a and b together.

$2a = 6$

$a = 3$

$2a = -6$

$a = -3$

Choose the correct answer

$[-5, 5]$

The minimum value of the function h : h (θ) = 5 cos 7 θ is ....

(a) 5 (b) zero (c) – 5 (d) – 7

Choose the correct answer

$[0,2]$

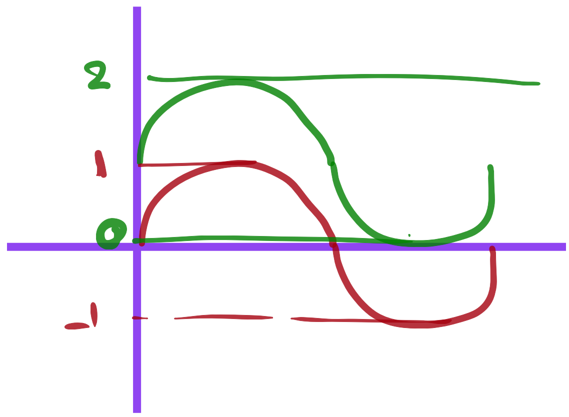
The minimum value of the function $f : f(\theta) = 1 + \sin 3\theta$ is ....

(a) -3 (b) -2 (c) zero (d) -4

$f(\theta) = 1 + \sin 3\theta$

$= 1 + [-1, 1]$

$= [0, 2]$



Choose the correct answer

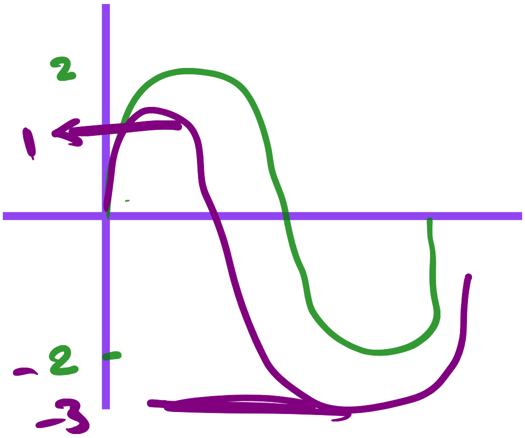
The minimum value of the function $f : f(X) = 2\cos X - 1$ is ....

(a) – 3 (b) – 2 (c) zero (d) – 1

$f(x) = 2\cos x - 1$

$= [-2, 2] - 1$

$= [-3, 1]$



Choose the correct answer

$[-4, 4]$

The maximum value of the function $g : g(\theta) = 4 \sin \theta$ is ....

(a) 4 (b) 1 (c) zero (d) ∞

Choose the correct answer

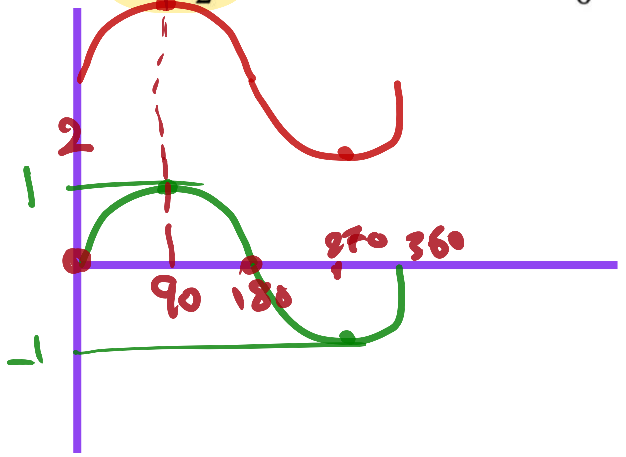
$\pi/2$

90

The function $f : f(x) = 3 + \sin(x)$ reaches its maximum value at $x =$ ……

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{2}$ (d) $\frac{7\pi}{6}$

$f(x) = 3 + \sin x$



math in use
BY MICHAEL GAMIL

Choose the correct answer

min max
$[-a, a]$

If $f(\theta) = 4 \sin 3\theta$, then the sum of the maximum value and the minimum value of the function $f(\theta) = \cdots\cdots\cdots$

(a) 8 (b) 6 (c) 2 (d) zero

range: $[-4, 4]$ $(-4) + (4) =$ zero

Choose the correct answer

The function $f : f(\theta) = 2 \sin 4\theta$ is a periodic function and its period equals ....

(a) 2π (b) π (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$

$$\frac{2\pi}{|b|} = \frac{\cancel{2}\pi}{\cancel{4}_2} = \frac{\pi}{2}$$

Choose the correct answer

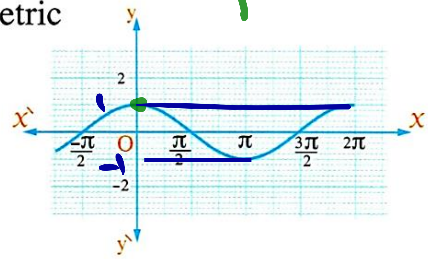
If f is a periodic function and its period equals $\frac{\pi}{2}$, then $f(X)$ could be ....

(a) $4 \sin X$ (b) $\sin 4X$ (c) $\frac{1}{4} \sin X$ (d) $\sin \frac{1}{4} X$

$$\frac{2\cancel{\pi}}{|b|} = \frac{\cancel{\pi}}{2} \Rightarrow |b| = 4$$

Choose the correct answer

The opposite figure represents the curve of the trigonometric function $y = f(X)$ then the rule of the function is ……….



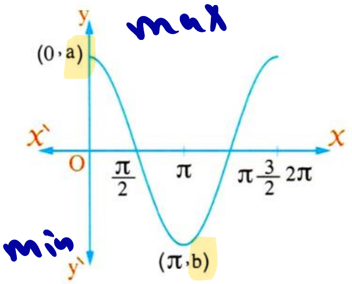
(a) $y = \sin \theta$ (b) $y = \cos \theta$
(c) $y = 2 \cos \theta$ (d) $y = 2 \sin \theta$

Choose the correct answer

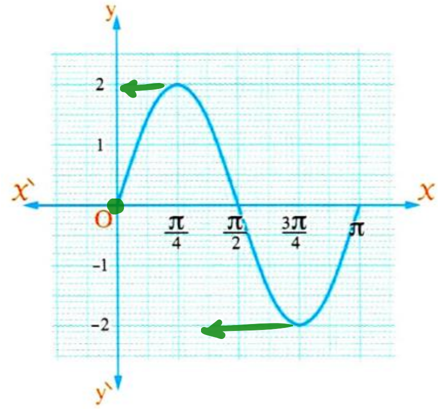
If the opposite figure represents the curve of the function $f : f(X) = \cos X$, then $a + b =$ Zero

(a) 1 (b) zero

(c) π (d) 2π



Choose the correct answer



The opposite figure represents one cycle of the trigonometric function $y = f(x)$, then the rule of the function is ....

(a) $y = 2 \sin x$ (b) $y = \sin 2x$

(c) $y = 2 \sin 2x$ (d) $y = \sin x$

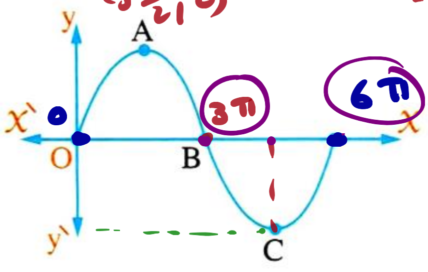
range

Period

$$\frac{2\cancel{\pi}}{|b|} = \cancel{\pi} \Rightarrow |b| = 2$$

Choose the correct answer

If the opposite figure represents the curve of the function $f : f(X) = 2 \sin \frac{1}{3} X$, then the coordinates of the point C ....



(a) $\left(\frac{3}{2}\pi, -1\right)$ (b) $(9\pi, -2)$

(c) $\left(\frac{2}{9}\pi, -2\right)$ (d) $\left(\frac{9}{2}\pi, -2\right)$

$\frac{0 + 3\pi}{2}$

$\frac{3\pi + 6\pi}{2} = \frac{9\pi}{2}$

$\frac{2\pi}{\frac{1}{3}} = 6\pi$

6π

Period $= \frac{2\pi}{|b|}$

Choose the correct answer

Number of times of intersections between the curve $y = \sin x$ with the x-axis on the interval $[0 , 2\pi]$ equals ....

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