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<https://physicsaholics.com/home/courseDetails/36>

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<https://youtu.be/V2qqaaYy-G4>

Written Solution on YouTube:-

<https://physicsaholics.com/note/notesDetails/70>

- Q 1. Find  $\cot(\pi+x)=?$   
(a)  $\cot(x)$  (b)  $\tan(x)$  (c)  $\sin(x)$  (d) none of these
- Q 2. Calculate  $\tan(270^\circ+\alpha)$ .  
(a)  $-\tan(\alpha)$  (b)  $-\cot(\alpha)$  (c)  $\sin(\alpha)$  (d) none of these
- Q 3. Find the value of  $\cos\frac{14\pi}{3}=?$ .  
(a) 1 (b)  $-1$  (c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$
- Q 4. Find  $\tan 1500^\circ = ?$   
(a)  $\sqrt{3}$  (b)  $-\sqrt{3}$  (c)  $\frac{1}{\sqrt{3}}$  (d)  $-\frac{1}{\sqrt{3}}$
- Q 5. Find  $\sin(-240^\circ) = ?$   
(a)  $\frac{1}{2}$  (b)  $\frac{\sqrt{3}}{2}$  (c)  $-\frac{1}{2}$  (d)  $-\frac{\sqrt{3}}{2}$
- Q 6. Find value of  $\sin^2 15^\circ + \sin^2 645^\circ$ :  
(a)  $\frac{1}{2}$  (b) 1 (c)  $\frac{1}{\sqrt{3}}$  (d) None of these
- Q 7. Find value of  $\sin x$  if  $\cos^2 x + \sin x = \frac{5}{4}$   
(a) 2 (b)  $-1$  (c)  $\frac{1}{2}$  (d) None of these
- Q 8. If  $\sin 25^\circ = x/y$ , then  $\sec 25^\circ - \sin 65^\circ$  is equal to  
(a)  $\frac{x^2}{y\sqrt{y^2-x^2}}$  (b)  $\frac{x}{y^2\sqrt{y^2-x^2}}$  (c)  $\frac{x}{y\sqrt{y^2-x^2}}$  (d)  $\frac{x^2}{y\sqrt{x^2-y^2}}$
- Q 9. If  $\frac{\cos \theta}{1+\sin \theta} + \frac{\cos \theta}{1-\sin \theta} = n \sec \theta$ , Find n ?  
(a) 1 (b) 2 (c) 3 (d) 4
- Q 10. Find value of  $\left(\frac{\sin 35^\circ}{\cos 55^\circ}\right)^2 + \left(\frac{\cos 55^\circ}{\sin 35^\circ}\right)^2 - 2 \cos 30^\circ = ?$   
(a)  $\sqrt{3}$  (b)  $\sqrt{2}$  (c)  $1 - \sqrt{3}$  (d)  $2 - \sqrt{3}$
- Q 11. If  $\cos^4 \theta - \sin^4 \theta = K$ , then find the value of K?  
(a) 1 (b)  $2 \cos^2 \theta - 1$   
(c)  $2 \sin^2 \theta - 1$  (d)  $1 - 2 \cos^2 \theta$















- Q 12. If  $a \sin \theta = \sqrt{3}$  and  $a \cos \theta = 1$ , then the value of 'a' is:  
(a)  $\frac{1}{2}$  (b)  $\sqrt{3}$  (c) 2 (d) -1
- Q 13. What is the value of  $\sin^2 \theta + \cos^2 \theta - \tan^2 \theta - \cot^2 \theta + \sec^2 \theta + \operatorname{cosec}^2 \theta = ?$   
(a) 2 (b) 3 (c) 5 (d) 7
- Q 14.  $5 \tan \theta = 4$ , then the value of  $\left(\frac{5 \sin \theta - 3 \cos \theta}{5 \sin \theta + 3 \cos \theta}\right) = ?$   
(a)  $\frac{1}{5}$  (b)  $\frac{2}{7}$  (c)  $\frac{2}{5}$  (d)  $\frac{1}{7}$
- Q 15. If  $\sin 37^\circ = \frac{3}{5}$ , Find  $\tan 16^\circ = ?$   
(a)  $\frac{9}{16}$  (b)  $\frac{24}{25}$  (c)  $\frac{16}{25}$  (d) None of these
- Q 16.  $\sin 75^\circ \cos 75^\circ = ?$   
(a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$  (c)  $\frac{3}{4}$  (d)  $\frac{\sqrt{3}}{2}$
- Q 17. Value of  $(0.9999)^6$  is approximately  
(a) 0.9991 (b) 0.9992 (c) 0.9994 (d) 0.9988
- Q 18. Approximate value of  $\sin 30.25^\circ - \sin 30^\circ$  is  
(a)  $\frac{\sqrt{3}\pi}{1440}$  (b)  $\frac{\sqrt{3}\pi}{720}$  (c)  $\frac{\pi}{1440}$  (d)  $\frac{\pi}{720}$
- Q 19. Find approximate change in volume of a cube on changing its side from 600.000 meter to 600.125 meter  
(a)  $125000 \text{ m}^3$  (b)  $145000 \text{ m}^3$  (c)  $115000 \text{ m}^3$  (d)  $135000 \text{ m}^3$
- Q 20. If  $\tan \theta = 1$ , Find  $\tan \frac{\theta}{2} = ?$   
(a) 0.41 (b) 0.62 (c) 0.84 (d) 0.31

## Answer Key

<b>Q.1 a</b>	<b>Q.2 b</b>	<b>Q.3 d</b>	<b>Q.4 a</b>	<b>Q.5 b</b>
<b>Q.6 b</b>	<b>Q.7 c</b>	<b>Q.8 a</b>	<b>Q.9 b</b>	<b>Q.10 d</b>
<b>Q.11 b</b>	<b>Q.12 c</b>	<b>Q.13 b</b>	<b>Q.14 d</b>	<b>Q.15 d</b>
<b>Q.16 b</b>	<b>Q.17 c</b>	<b>Q.18 a</b>	<b>Q.19 d</b>	<b>Q.20 a</b>

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# Written Solution

**DPP-1 Basic Maths: Trigonometry**

**By Physicsaholics Team**

Solution: 1

$$\cos(\pi + \alpha) = ?$$

for  $\pi$

$\cos \rightarrow \cos$

$\cos = +ve$

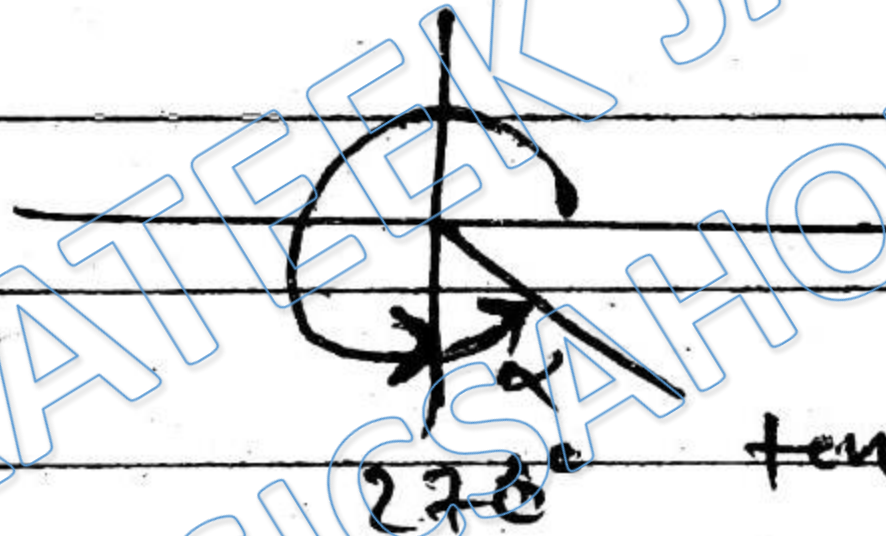


$$\therefore \cos(\pi + \alpha) = \cos(\alpha)$$

Ans. a

Solution: 2

$$\tan(270^\circ + \alpha)$$



$$\tan(\text{ve.})$$

$$= -\cot \alpha$$

Ans. b

Solution: 3

$$\cos \frac{14\pi}{3} = ?$$

$$\cos \frac{14\pi}{3} = \cos \frac{12\pi + 2\pi}{3}$$

$$= \cos \left( 4\pi + \frac{2\pi}{3} \right) = \cos \frac{2\pi}{3}$$

$$= \cos \frac{2\pi}{3} = \cos \left( \pi - \frac{\pi}{3} \right) = -\cos \frac{\pi}{3}$$

$$= -\cos \frac{\pi}{3} = -\frac{1}{2}$$

Ans. d

Solution: 4

$$\begin{aligned} & \tan 1500^\circ \\ &= \tan (4 \times 360^\circ + 60^\circ) \\ &= \tan 60^\circ \\ &= \sqrt{3} \end{aligned}$$

Since  $\tan (2n\pi \pm \theta) = \tan \theta$

PRATEEK JAIN  
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Ans(a)



Solution: 5

$$\begin{aligned} & \sin(-240^\circ) \\ &= \sin(360^\circ - 240^\circ) \quad \text{Since } \sin(2\pi + \theta) = \sin \theta \\ &= \sin 120^\circ \\ &= \sin(180^\circ - 60^\circ) \\ &= \sin 60^\circ \\ &= \frac{\sqrt{3}}{2} \end{aligned}$$

Ans(b)

Solution: 6

$$\sin^2 15^\circ + \sin^2 645^\circ$$

$$= \frac{1}{2} [2 \sin^2 15^\circ + 2 \sin^2 645^\circ]$$

$$= \frac{1}{2} [1 - \cos 30^\circ + 1 - \cos 1290^\circ], \text{ Since } 2 \sin^2 \theta = 1 - \cos 2\theta$$

$$= \frac{1}{2} \left[ 2 - \frac{\sqrt{3}}{2} - \cos (1440^\circ - 150^\circ) \right]$$

$$= \frac{1}{2} \left[ 2 - \frac{\sqrt{3}}{2} - \cos 150^\circ \right] = \frac{1}{2} \left[ 2 - \frac{\sqrt{3}}{2} - \cos (180 - 30^\circ) \right]$$

$$= \frac{1}{2} \left[ 2 - \frac{\sqrt{3}}{2} + \cos 30^\circ \right] = 1$$

Ans (b)

Solution: 7

$$\cos^2 x + \sin x = \frac{5}{4}$$

$$\cos^2 x + \sin x = 1$$

$$\cos^2 x = 1 - \sin^2 x$$

$$\text{So, } 1 - \sin^2 x + \sin x = \frac{5}{4}$$

$$-1 + \sin^2 x + \sin x = \frac{5}{4}$$

$$\sin^2 x + \sin x + \frac{1}{4} = 0$$

$$\text{Put } y = \sin x$$

$$y^2 + y + \frac{1}{4} = 0$$

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

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

$$y = \frac{1 \pm 0}{2}$$

$$y = \frac{1}{2} = \sin x$$

Ans. c

Solution: 8

$$\sin 25^\circ = \frac{x}{y} \Rightarrow \sin^2 25^\circ = \frac{x^2}{y^2}$$

then  $\sec 25^\circ - \sin 65^\circ = p$

$$p = \sec 25^\circ - \sin 65^\circ$$
$$= \frac{1}{\cos 25^\circ} - \sin(90^\circ - 25^\circ)$$

$$= \frac{1}{\cos 25^\circ} - \cos 25^\circ$$

$$p = \frac{1 - (\cos 25^\circ)^2}{\cos 25^\circ} \quad \text{--- (1)}$$

From  $\sin 25^\circ = \frac{x}{y}$

$$4 \quad \sin^2 25^\circ + \cos^2 25^\circ = 1$$

$$4 \quad \sin^2 25^\circ + \cos^2 25^\circ = 1$$

$$\cos^2 25^\circ = 1 - \sin^2 25^\circ$$

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

$$\cos 25^\circ = \sqrt{1 - \frac{x^2}{y^2}}$$

put  $\cos 25^\circ$  &  $\cos^2 25^\circ$  in eq<sup>n</sup> (1)

$$p = \frac{1 - \left(1 - \frac{x^2}{y^2}\right)}{\sqrt{1 - \frac{x^2}{y^2}}} = \frac{\frac{x^2}{y^2}}{\frac{\sqrt{y^2 - x^2}}{y}}$$

$$p = \frac{x^2}{y \sqrt{y^2 - x^2}}$$

Ans. a

Solution: 9  $\frac{\cos \theta}{1 + \sin \theta} + \frac{\cos \theta}{1 - \sin \theta}$

$$= \left( \frac{1 - \sin \theta + 1 + \sin \theta}{1 - \sin^2 \theta} \right) \cos \theta$$

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

$$= \frac{2 \cos \theta}{\cos^2 \theta} = 2 \sec \theta = n \sec \theta$$

$$\Rightarrow n = 2$$

Ans (b)

Solution: 10

$$k = \left( \frac{\sin 35^\circ}{\cos 55^\circ} \right)^2 + \left( \frac{\cos 55^\circ}{\sin 35^\circ} \right)^2 - 2 \cos 30^\circ$$

$$k = \left( \frac{\sin 35^\circ}{\cos(90-55^\circ)} \right)^2 + \left( \frac{\cos 55^\circ}{\sin(90-55^\circ)} \right)^2 - 2 \cos 30^\circ$$

$$= \left( \frac{\sin 35^\circ}{\sin 35^\circ} \right)^2 + \left( \frac{\cos 55^\circ}{\cos 55^\circ} \right)^2 - 2 \cos 30^\circ$$

$$= 1^2 + 1^2 - 2 \left( \frac{\sqrt{3}}{2} \right)$$

$$\boxed{k = 2 - \sqrt{3}}$$

Ans. d

Solution: 11

$$\cos^4 \theta - \sin^4 \theta = k$$

$$(\cos^2 \theta - \sin^2 \theta)(\cos^2 \theta + \sin^2 \theta) = k$$

$$\therefore a^2 - b^2 = (a-b)(a+b)$$

$$\text{So } a^4 - b^4 = (a^2 - b^2)(a^2 + b^2)$$

$$\text{Now } (\cos^2 \theta - \sin^2 \theta)(1) = k$$

$$\cos^2 \theta - (1 - \cos^2 \theta) = k$$

$$2\cos^2 \theta - 1 = k$$

$$k = 2\cos^2 \theta - 1$$

Ans. b

Solution: 12

$$a \sin \theta = \sqrt{3} \Rightarrow \sin \theta = \frac{\sqrt{3}}{a}$$

$$a \cos \theta = 1 \Rightarrow \cos \theta = \frac{1}{a}$$

$$\frac{\sin \theta}{\cos \theta} = \frac{\sqrt{3}/a}{1/a} = \sqrt{3}$$

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

$$\theta = 60^\circ$$

So;  $a \sin \theta = \sqrt{3}$

$$\sin 60^\circ = \frac{\sqrt{3}}{a}$$

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

$$\boxed{a=2}$$

OR

$$(a \sin \theta)^2 + (a \cos \theta)^2 = (\sqrt{3})^2 + (1)^2$$

$$a^2 (\sin^2 \theta + \cos^2 \theta) = 3 + 1$$

$$a^2 = 4$$

$$\Rightarrow a = 2$$

Ans. c



Solution: 13

$$k = \sin^2 \theta + \cos^2 \theta - \tan^2 \theta - (\cot^2 \theta + \sec^2 \theta + \operatorname{cosec}^2 \theta)$$

$$k = (\sin^2 \theta + \cos^2 \theta) + (\sec^2 \theta - \tan^2 \theta) + (\operatorname{cosec}^2 \theta - \cot^2 \theta)$$

$$k = 1 + 1 + 1$$

$k = 3$

Ans. b

Solution: 14

$$5 \tan \theta = 4$$

$$\text{So, } \sin \theta = \frac{4}{\sqrt{41}}$$

$$\cos \theta = \frac{5}{\sqrt{41}}$$

$$\text{Now, } k = \frac{5 \sin \theta - 3 \cos \theta}{5 \sin \theta + 3 \cos \theta}$$

$$k = \frac{5 \left( \frac{4}{\sqrt{41}} \right) - 3 \left( \frac{5}{\sqrt{41}} \right)}{5 \left( \frac{4}{\sqrt{41}} \right) + 3 \left( \frac{5}{\sqrt{41}} \right)}$$

$$k = \frac{20 - 15}{20 + 15}$$

$$k = \frac{5}{35} = \frac{1}{7}$$

$$\boxed{k = \frac{1}{7}}$$

OR

$$5 \sin \theta - 3 \cos \theta$$

$$5 \sin \theta + 3 \cos \theta$$

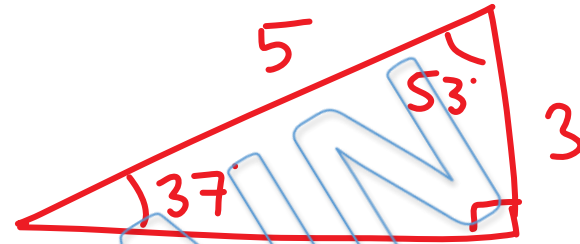
$$\frac{5 \tan \theta - 3}{5 \tan \theta + 3} = \frac{4 - 3}{4 + 3}$$

$$= \frac{1}{7}$$

Ans. d

Solution: 15

$$\sin 37^\circ = \frac{3}{5}$$



$$\Rightarrow \tan 53^\circ = \frac{4}{3}, \quad \tan 37^\circ = \frac{3}{4} \quad b = \sqrt{5^2 - 3^2} = 4$$

$$\begin{aligned} \tan 16^\circ &= \tan(53^\circ - 37^\circ) = \frac{\tan 53^\circ - \tan 37^\circ}{1 + \tan 37^\circ \cdot \tan 53^\circ} \\ &= \frac{\frac{4}{3} - \frac{3}{4}}{1 + \frac{4 \times 3}{3 \times 4}} = \frac{7}{24} \end{aligned}$$

Ans(d)

Solution: 16

$$\sin 75^\circ \cos 75^\circ$$

$$= \frac{1}{2} \times 2 \sin 75^\circ \cos 75^\circ$$

$$= \frac{1}{2} \times \sin 150^\circ$$

$$= \frac{1}{2} \sin (90^\circ + 60^\circ)$$

$$= \frac{1}{2} \cos 60^\circ$$

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

Since  $2 \sin A \cos A = \sin 2A$

Ans(b)

Solution: 17

$$\begin{aligned} & (0.9999)^6 \\ &= (1 - 0.0001)^6 \\ &\approx (1 - 0.0006) \\ &= 0.9994 \end{aligned}$$

Ans(c)

Solution: 18

$$\begin{aligned} & \sin(30.25^\circ) - \sin 30^\circ \\ &= [\sin 30^\circ \times \cos .25^\circ + \cos 30^\circ \times \sin .25^\circ] - \sin 30^\circ \\ &= \left[ \frac{1}{2} \times 1 + \frac{\sqrt{3}}{2} \times \sin\left(\frac{\pi}{14 \times 180}\right) \right] - \frac{1}{2} \\ &= \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\pi}{720} - \frac{1}{2} \\ &= \frac{\sqrt{3} \pi}{1440} \end{aligned}$$

Ans(a)

Solution: 19

$$\begin{aligned}\text{Change in volume} &= (600 \cdot 125)^3 - (600)^3 \\ &= (600 + 125)^3 - (600)^3 \\ &= (600)^3 \left[ 1 + \frac{125}{600} \right]^3 - (600)^3 \\ &= (600)^3 \left[ 1 + \frac{125 \times 3}{600} \right] - (600)^3 \\ &= \frac{125 \times 3}{600} \times (600)^3 = 375 \times 36 \times 10^4 \\ &= 3750 \times 36 \\ &= 13500 \text{ m}^3\end{aligned}$$

Ans (d)

Solution: 20

$$\tan \theta = \frac{2 \tan \theta/2}{1 - \tan^2 \theta/2} = \frac{2x}{1-x^2} \text{ where } x = \tan \theta/2$$

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

$$\Rightarrow x^2 + 2x - 1 = 0$$

$$\Rightarrow x = \frac{-2 \pm \sqrt{4+4}}{2} = \frac{-2 \pm 2\sqrt{2}}{2}$$

$$= -1 \pm \sqrt{2}$$

$$= -1 \pm 1.41$$

$$= 0.41, -2.41$$

Ans(a)



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