Yakeen NEET 2.0 (2026)

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KPP-02 Basic Maths and Calculus (Mathematical Tools)

इस KPP का उद्देश्य (Purpose) अभी तक जितना पढा है उसको revise करना है। और 20 मिनट में पुरे questions को solve करने की कोशिश करे।

Trigonometric Reduction Formulae:

$\sin(90° + \theta) = \cos\theta$ $\cos(90° + \theta) = -\sin\theta$ $\tan(90° + \theta) = -\cot\theta$ $\sin(180° + \theta) = -\sin\theta$ $\cos(180° + \theta) = -\cos\theta$ $\tan(180° + \theta) = \tan\theta$	$\sin(180° - \theta) = \sin\theta$ $\cos(180° - \theta) = -\cos\theta$ $\tan(180° - \theta) = -\tan\theta$ $\sin(270° - \theta) = -\cos\theta$ $\cos(270° - \theta) = -\sin\theta$ $\tan(270° - \theta) = \cot\theta$
$\sin(-\theta) = -\sin\theta$ $\cos(-\theta) = \cos\theta$ $\tan(-\theta) = -\tan\theta$ $\sin(270° + \theta) = -\cos\theta$ $\cos(270° + \theta) = \sin\theta$ $\tan(270° + \theta) = -\cot\theta$	$\sin(90° - \theta) = \cos\theta$ $\cos(90° - \theta) = \sin\theta$ $\tan(90° - \theta) = \cot\theta$ $\sin(360° - \theta) = -\sin\theta$ $\cos(360° - \theta) = \cos\theta$ $\tan(360° - \theta) = -\tan\theta$

1. As θ increases from 0° to 90°, the value of $\cos\theta$

(1) Increases
(2) Decreases
(3) Remains constant
(4) First decreases then increases

2. The greatest value of the function $8\sin\theta - 6\cos\theta$ is:

(1) 10
(2) 12
(3) 20
(4) 15

3. What is the minimum value of

$$\frac{2}{4+\sin\theta+\sqrt{3}\cos\theta}?$$

(1) 0
(2) 1
(3) 1/3
(4) 1/2

4. Match List-I with List-II.

List-I		List-II	
(A)	$\sin\left(\frac{\pi}{2}-\theta\right)$	(I)	$-\tan\theta$
(B)	$\sin 2\theta$	(II)	$2\cos^2\theta - 1$
(C)	$\tan(-\theta)$	(III)	$2\sin\theta\cos\theta$
(D)	$\cos 2\theta$	(IV)	$\cos\theta$

Choose the correct answer from the options given below:

(1) A–I, B–II, C–III, D–IV
(2) A–II, B–IV, C–I, D–III
(3) A–III, B–I, C–IV, D–II
(4) A–IV, B–III, C–I, D–II

5. $\cos^2\theta$ can be equated to:

(1) $\frac{1+\cos 2\theta}{2}$ (2) $\frac{1-\cos 2\theta}{2}$
(3) $1 + \sin^2\theta$ (4) $\cos(2\theta)$

6. As θ increases from 0° to 90°, the value of $\cos\theta$.

(1) Increases
(2) Decreases
(3) Remains constant
(4) First decreases then increases.

7. The greatest value of the function $-5\sin\theta + 12\cos\theta$ is:

(1) 12 (2) 13
(3) 7 (4) 17

8. Find the value of $\sin(90 + \theta)$

(1) $\sin\theta$
(2) $-\sin\theta$
(3) $\cos\theta$
(4) $-\cos\theta$

9. Minimum value of $\cos\theta$ for $-\pi \le \theta \le \pi$

(1) -1 (2) $+1$

(3) 0 (4) $\frac{1}{2}$

10. If $y = \sin 2\theta$ then find 'θ' where y will be maximum

(1) 90° (2) 60°

(3) 45° (4) 32°

11. Find maximum value of 'y' where $y = 2\sin\theta + \sqrt{5}\cos\theta$.

(1) 3 (2) $2 + \sqrt{5}$

(3) $2\sqrt{5}$ (4) $\sqrt{5}$

12. Friction force acting on an object is given as function of angle 'θ' $f_r = \frac{\mu mg}{\sin\theta + \mu\cos\theta}$ then find the value of θ for which f_r will be minimum.

(1) μmg (2) $\frac{\mu mg}{1+\mu}$

(3) $\frac{\mu mg}{\sqrt{1+\mu^2}}$ (4) Zero

13. A car is moving towards a building with speed 10 m/s. At any instant the angle of elevation of the building is 30° after 5 sec. the angle of elevation of the building becomes 45°, then height of building is

(1) $h = \frac{50}{\sqrt{3}+1}$ (2) $h = \frac{20}{\sqrt{3}+1}$

(3) $h = \frac{20}{\sqrt{3}-1}$ (4) $h = \frac{50}{\sqrt{3}-1}$

14. Find value of different trigonometric function

(i) sin (135°) (ii) tan (120°)

(iii) cos (150°) (iv) tan (45°)

(v) tan 37° (vi) cos 53°

(vii) cos (–60°)

15. A man is standing at a distance of 500 m from a building. He notes that angle of elevation of the top of the building is 3.6°. Find the height of the building. Neglect the height of the man and take $\pi = 3.14$.

16. Find the value of:

(i) tan 135°

(ii) sin(–30°)

(iii) cos(–60°)

(iv) tan(–45°)

17. Find maximum and minimum values of function y:

(i) $y = 2\sin x$

(ii) $y = 4 - \cos x$

(iii) $y = 3\sin x + 4\cos x$

18. What is the value of x for which y is maximum $y = k\sin 2x$.

19. The maximum value of the function $f(x) = \sqrt{3}\sin x + \cos x$, is:

20. Find the value of

(i) sin 74°

(ii) cos 106°

(iii) sin 15°

21. Find maximum and minimum value of

(i) $8 - 6\cos x$

(ii) $3\sin x - 4\cos x$

(iii) $5\sin(x) + 12\cos x + 4$

22. Evaluate:

(i) $2\sin 15°\cos 15°$

(ii) $\sin 22.5°\cos 22.5°$

(iii) tan 75°

(iv) $\sin^2 22.5°$

23. Evaluate:

(i) cos 15° (ii) cos 53°

(iii) tan 37° (iv) sin53° – cos 37°

24. Evaluate:

(i) $\frac{\sin 135°}{\cos 120°}$

(ii) $\frac{\sin 120°}{\cos 15°}$

(iii) sin 105°

(iv) sin 300°

(v) cos 240°

(vi) $\sin^2(20°) + \sin^2(70°)$

Answer Key

1. **(2)**
2. **(1)**
3. **(3)**
4. **(4)**
5. **(1)**
6. **(2)**
7. **(2)**
8. **(3)**
9. **(1)**
10. **(3)**
11. **(1)**
12. **(3)**
13. **(4)**

14. (i) $\frac{1}{\sqrt{2}}$; (ii) $-\sqrt{3}$; (iii) $-\frac{\sqrt{3}}{2}$; (iv) 1; (v) $\frac{3}{4}$; (vi) $\frac{3}{5}$; (vii) $\frac{1}{2}$

15. **31.40 m**

16. (i) –1; (ii) $-\frac{1}{2}$; (iii) $\frac{1}{2}$; (iv) –1

17. **(i) 2, –2; (ii) 5, 3; (iii) 5, –5**

18. $\frac{\pi}{4}$ rad

19. **(2)**

20. (i) $\frac{24}{25}$; (ii) $-\frac{7}{25}$; (iii) $\sin 30° = \frac{\sqrt{3}-1}{2\sqrt{2}}$

21. **(i) 14, 2; (ii) 5, –5; (iii) 17, –9**

22. (i) $\frac{1}{2}$; (ii) $\frac{1}{2\sqrt{2}}$; (iii) $\frac{\sqrt{3}+1}{\sqrt{3}-1}$; (iv) $\frac{\sqrt{2}-1}{2\sqrt{2}}$

23. (i) $\frac{\sqrt{3}+1}{2\sqrt{2}}$; (ii) $\frac{3}{5}$; (iii) $\frac{3}{4}$; (iv) 0

24. (i) $-\sqrt{2}$; (ii) $\frac{\sqrt{6}}{\sqrt{3}+1}$; (iii) $\frac{\sqrt{3}+1}{2\sqrt{2}}$; (iv) $\frac{-\sqrt{3}}{2}$; (v) $\frac{-1}{2}$; (vi) 1

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