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Dept. of Mathematics 2025 – 2026
Class XI – Mathematics
Work Sheet – Trigonometry

1	$\frac{\cos 17^\circ + \sin 17^\circ}{\cos 17^\circ - \sin 17^\circ} =$ (a) $\tan 62^\circ$ (b) $\tan 28^\circ$ (c) $\tan 17^\circ$ (d) $\tan 34^\circ$
2	If $\cos A + \cos B = 2$, then find the value of $\cos^2 \frac{A}{2} + \cos^2 \frac{B}{2}$ is (a) 0 (b) 1 (c) $\frac{3}{2}$ (d) 2
3	The value of $\cos 2^\circ \cos 4^\circ \cos 6^\circ \cdots \cos 178^\circ$ is equal to ..... (a) 1 (b) 0 (c) $\frac{1}{8}$ (d) –1
4	If $\operatorname{cosec}(\alpha + \beta) = 1$, then $\cos(2\alpha + \beta)$ is equal to ..... . (a) $\sin\alpha$ (b) $\cos\alpha$ (c) $-\cos\alpha$ (d) $-\sin\alpha$
5	If $A + B = \frac{\pi}{4}$, then $(1 + \tan A)(1 + \tan B) = ?$ (a) 1 (b) 2 (c) –1 (d) –2
6	$\frac{\tan 70^\circ - \tan 20^\circ}{\tan 50^\circ} =$ (a) 1 (b) –1 (c) 2 (d) –2
7	The value of $2 \sin 2A - 8 \cos A \sin^3 A$ is equal to (a) $\cos 3A$ (b) $\sin 3A$ (c) $\sin 4A$ (d) $\cos 4A$
8	$\cos 57^\circ + \sin 27^\circ = ?$ (a) $\cos 3^\circ$ (b) $\sin 3^\circ$ (c) $\tan 3^\circ$ (d) $\cot 3^\circ$
9	$2(\sin^2 10^\circ + \sin^2 20^\circ + \sin^2 30^\circ + \cdots + \sin^2 90^\circ)$ is equal to (a) 5 (b) 8 (c) 10 (d) 11
10	If $\cos\theta = \frac{1}{2}\left(a + \frac{1}{a}\right)$, then $\cos 2\theta = ?$ (a) $\frac{1}{2}\left(a^2 + \frac{1}{a^2}\right)$ (b) $\frac{1}{2}\left(a^2 - \frac{1}{a^2}\right)$ (c) $a + \frac{1}{a}$ (d) $\left(a + \frac{1}{a}\right)^2$

11	If $\cos(\alpha+\beta) = m\cos(\alpha-\beta)$, then $\tan\alpha\tan\beta =$ (a) m (b) $\frac{m+1}{m-1}$ (c) $\frac{1-m}{1+m}$ (d) $\frac{m-1}{m+1}$
12	If $\theta = \frac{\pi}{8}$, $\cos\theta + \cos 7\theta = ?$ (a) 0 (b) 1 (c) 7 (d) 8
13	If $\tan A + \cot A = 5$, then $\tan^4 A + \cot^4 A$ is equal to ..... . (a) 256 (b) 529 (c) 625 (d) 527
14	If $x = \tan\theta$, then $\frac{1-x^2}{1+x^2}$ is equal to ..... . (a) $\cos 2\theta$ (b) $\cos\theta$ (c) $\cos\frac{\theta}{2}$ (d) $\sec 2\theta$
15	$\tan 5° + \tan 15° + \tan 25° + \cdots + \tan 355°$ is equal to ..... . (a) 1 (b) 0 (c) –1 (d) not defined
16	The angles of a triangle are in A.P. and the greatest angle is 105°, then the least angle in radians is (a) $\frac{\pi}{15}$ (b) $\frac{2\pi}{15}$ (c) $\frac{\pi}{12}$ (d) $\frac{\pi}{6}$
17	$\sin 20°(\tan 10° + \cot 10°)$ is (a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$
18	The value of $\tan 70° - \tan 10° - \sqrt{3}\tan 70°\tan 10°$ is equal to ..... (a) 0 (b) $\sqrt{3}$ (c) $\sqrt{3}-1$ (d) $\sqrt{3}+1$

For 19 and Q20, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

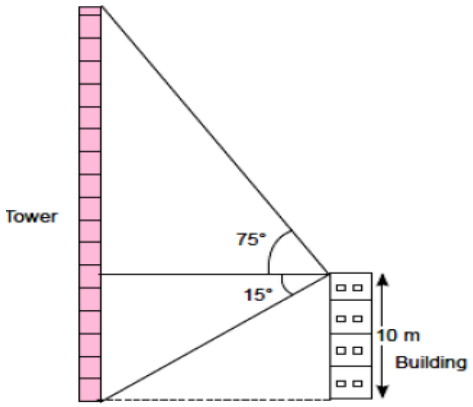
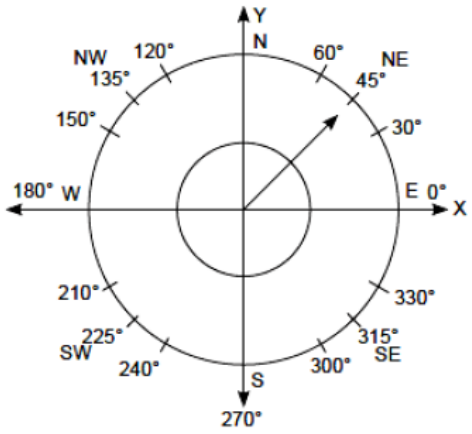
(c) A is true but R is false.

(d) A is false but R is true.

19	Assertion (A): The ratio of the radii of two circles at the centres of which two equal ares subtend angles of 30° and 70° is 21:10. Reason (R): Number of radians in an angle subtended at the centre of a circle by an arc is equal to the ratio of the length of the arc to the radius of the cirele.

20	Assertion (A): cosec x is negative in third and fourth quadrants. Reason (R): cot x decreases from 0 to -oo in first quadrant and increases from 0 to co in third quadrant.
21	Find the value of $\sin\left(-\frac{11\pi}{3}\right)$.
22	Find the value of the trigonometric function cosec (– 1410°).
23	Find the value of cos 55° + cos 125° + cos 300°
24	What is the value of $\sin\frac{31\pi}{3}$?
25	Convert 40° 20′ in radian measure.
26	Express –22° 30′ in radian measure.
27	What is the value of sin 75°?
28	Express –47° 30′ in radian measure
29	What is the value of $\cot\left(-\frac{15\pi}{4}\right)$?
30	Find the value of $\tan\left(\frac{19\pi}{3}\right)$.
31	Write $\frac{13\pi}{4}$ in degrees.
32	Find $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$, if $\tan x = -\frac{4}{3}$, where x is in II quadrant
33	Find the value of $\tan\frac{13\pi}{12}$
34	Prove that $\sin 3x + \sin 2x - \sin x = 4 \sin x \cos\frac{x}{2}\cos\frac{3x}{2}$

35	Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$
36	Prove that $(\sin 3x + \sin x)\sin x + (\cos 3x - \cos x)\cos x = 0$.
37	Find the value of $2\sin^2\frac{3\pi}{4} + 2\cos^2\frac{3\pi}{4} - 2\tan^2\frac{3\pi}{4}$
38	Prove that : $\cos 2x \cos\frac{x}{2} - \cos 3x \cos\frac{9x}{2} = \sin 5x \sin\frac{5x}{2}$
39	Prove that: ten x + tan $(60° + x)$ + tan $(120° + x)$ = 3 tan $3x$.
40	Find the value of sin 75° cos 15° + cos 75° sin 15°.
41	Find the value of $\sin\frac{5\pi}{3}$.
42	If sin A = $\frac{1}{2}$, what is the value of sin 3A?
43	Find the value of tan (–1125°).
44	Find the value of $\frac{\cos(\pi+\theta)\cos(-\theta)}{\sin(\pi-\theta)\cos\left(\frac{\pi}{2}+\theta\right)}$
45	Find the value of cos 150° + sin 420°.
46	Find the value of tan 75°.
47	Find the value of sin $(40° + \theta)$ cos $(10° + \theta)$ – cos $(40° + \theta)$ sin $(10° + \theta)$.
48	Find the value of $\cos^2 52° - \sin^2 38°$.
49	If $4\sin^2\theta = 1$, find the value of $\frac{2+3\cos^2\theta}{1-2\sin^2\theta}$
50	Find the value of $2\sin^2\frac{3\pi}{4} + 2\cos^2\frac{\pi}{4}$.

51	If tan A = $\frac{2}{3}$, find the value of tan 2A.	
52	Find the angle traced between the minute hand and the hour hand of a clock when the time is 7:20 A.M.	
53	Find the angle in degrees subtended at the centre of a circle by an arc whose length is 2.2 times the radius.	
54	A wheel makes 270 revolutions in one minute. Through how many radians does it turn in one second?	
	CASE STUDY	
55	From the top of a tower of 10 m high building the angle of elevation of top of a tower is 75° and the angle of depression of foot of the tower is 15°. If the tower and building are on the same horizontal surfaces. (i) Find the value of tan 15°. (2) (ii) Find the value of cos 75°.	
56	The below figure shows the compass. The East direction is along the positive X-axis (0° angle) and North direction is along the +ve Y-axis (90° angles). Initially the pointer is pointed towards North-East direction. Pointer is deflected in a magnetic field by some angle. **On the basis of above answer the following.**	
	(i) If pointer move in anticlockwise direction by an angle of 90°, then find the value of sine of angle made by pointer from East direction. (ii) If pointer moves an angle of 165° from its initial position in anticlockwise direction, then Find the value of cosine of angle made by pointer from East direction. (iii) If the sine and cosine of angle made by pointer with East direction is = $\frac{-1}{\sqrt{2}}$ then find where the pointer pointed? - OR - How much angle will pointer move in anticlock wise direction if tangent of angle made By pointer with x-axis is - 1?	

Answers

1	A	2	D	3	B	4	D
5	B	6	C	7	C	8	A
9	C	10	A	11	C	12	A
13	D	14	A	15	B	16	C
17	C	18	B	19	D	20	C
21	$\frac{\sqrt{3}}{2}$	22	2	23	$\frac{1}{2}$	24	$\frac{\sqrt{3}}{2}$
25	$\frac{121\pi}{540}$	26	$-\frac{\pi}{8}$	27	$\frac{\sqrt{3}+1}{2\sqrt{2}}$	28	$-\frac{19\pi}{72}$
29	1	30	$\sqrt{3}$	31	585^0		
32	$\cos x = -\frac{3}{5}$. $\sin\frac{x}{2} = \frac{2}{\sqrt{5}}$ $\cos\frac{x}{2} = \frac{1}{\sqrt{5}}$. $\tan\frac{x}{2} = : 2.$						

33	$2-\sqrt{3}$	37	0
40	1	41	$-\frac{\sqrt{3}}{2}$
42	1	43	-1
44	$\cot^2\theta$	45	0
46	$2+\sqrt{3}$	47	$\frac{1}{2}$
48	0	49	$\frac{17}{2}$
50	2	51	$\frac{12}{5}$
52	220^0	53	126^0
54	9π radian		
55i	$\sqrt{3}-1/\sqrt{3}+1$.	55ii	$(\sqrt{3}-1)/2\sqrt{2}$
56i	$\frac{1}{\sqrt{2}}$	56ii	$-\frac{\sqrt{3}}{2}$
56iii	$\theta = 225°$ South West direction	56ii	90° or 270°