



QUICK DRILL · CBSE CLASS 11

Trigonometric Functions

Mathematics · Chapter 3 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE _____	TOTAL MARKS 15	DURATION 20 min	MARKING +1 / 0	TARGET ≥ 12/15
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OBJECTIVES

Reinforce the four core topics of Trigonometric Functions via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1-15 · 20 MIN

Q1. Convert 75° to radians.(A) $5\pi/12$ (C) $5\pi/6$

PYQ 2019 · Delhi · 1m · 25s

(B) $7\pi/12$ (D) $\pi/4$

Q2. The arc length of a circle of radius 10 cm subtending an angle of 2 rad at the centre is:

(A) 5 cm

(C) 20 cm

PYQ 2020 · All India · 1m · 25s

(B) 10 cm

(D) 40 cm

Q3. If $\sin x = 4/5$ and x lies in Q2, then $\cos x$ equals:(A) $3/5$ (C) $5/3$

PYQ 2018 · Delhi · 1m · 35s

(B) $-3/5$ (D) $-5/3$ Q4. The value of $\sin 75^\circ$ is:(A) $(\sqrt{6} - \sqrt{2})/4$ (C) $(\sqrt{3} + 1)/2$

PYQ 2023 · Delhi · 1m · 45s

(B) $(\sqrt{6} + \sqrt{2})/4$ (D) $1/2$ Q5. $\sin 2x$ in terms of $\sin x$ and $\cos x$ is:(A) $2 \sin x$ (C) $\sin^2 x - \cos^2 x$

PYQ 2021 · Delhi · 1m · 25s

(B) $2 \sin x \cos x$ (D) $1 - 2 \cos^2 x$ Q6. The general solution of $\sin x = 1/2$ is:(A) $x = 2n\pi \pm \pi/6$ (C) $x = n\pi + \pi/6$

PYQ 2022 · All India · 1m · 35s

(B) $x = n\pi + (-1)^n \pi/6$ (D) $x = n\pi - \pi/6$ Q7. The value of $\cos(-60^\circ)$ is:(A) $-1/2$ (C) $-\sqrt{3}/2$

PYQ 2020 · Delhi · 1m · 25s

(B) $1/2$ (D) $\sqrt{3}/2$ Q8. If $\tan x = 3/4$ and x is in Q3, then $\sin x$ equals:(A) $3/5$ (C) $4/5$

PYQ 2021 · All India · 1m · 50s

(B) $-3/5$ (D) $-4/5$ Q9. The area of a sector of radius 6 cm with central angle $\pi/3$ rad is:(A) $\pi \text{ cm}^2$ (C) $6\pi \text{ cm}^2$

PYQ 2019 · All India · 1m · 30s

(B) $3\pi \text{ cm}^2$ (D) $12\pi \text{ cm}^2$ Q10. $\cos(A + B)$ equals:(A) $\cos A \cos B + \sin A \sin B$ (C) $\sin A \cos B + \cos A \sin B$

PYQ 2018 · All India · 1m · 25s

(B) $\cos A \cos B - \sin A \sin B$ (D) $\sin A \cos B - \cos A \sin B$

Q11. The period of the function $f(x) = \sin 4x$ is:

(A) $\pi/4$

(C) π

PYQ 2022 · Delhi · 1m · 30s

(B) $\pi/2$

(D) 2π

Q12. The value of $\tan 15^\circ$ is:

(A) $2 - \sqrt{3}$

(C) $\sqrt{3} - 1$

PYQ 2023 · All India · 1m · 60s

(B) $2 + \sqrt{3}$

(D) $(\sqrt{3} - 1)/2$

Q13. If $\sin \theta = \cos \theta$, then θ (in $(0, \pi/2)$) equals:

(A) $\pi/6$

(C) $\pi/3$

PYQ 2020 · Delhi · 1m · 30s

(B) $\pi/4$

(D) $\pi/2$

Q14. The range of $f(x) = 3 \sin x$ is:

(A) $[-1, 1]$

(C) $\mathbb{R}$

PYQ 2019 · Delhi · 1m · 30s

(B) $[-3, 3]$

(D) $[0, 3]$

Q15. $\cos 2x$ in terms of $\sin x$ is:

(A) $1 + 2 \sin^2 x$

(C) $2 \sin^2 x - 1$

PYQ 2021 · Delhi · 1m · 25s

(B) $1 - 2 \sin^2 x$

(D) $\sin^2 x - 1$

ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

Q1. Answer: A

$$75 \times (\pi/180) = 75\pi/180 = 5\pi/12 \text{ rad.}$$

Q2. Answer: C

$$s = r\theta = 10 \times 2 = 20 \text{ cm.}$$

Q3. Answer: B

$$\cos^2 x = 1 - 16/25 = 9/25; |\cos x| = 3/5. \text{ In Q2 } \cos \text{ is negative } \Rightarrow \cos x = -3/5.$$

Q4. Answer: B

$$\sin 75^\circ = \sin(45^\circ + 30^\circ) = \sin 45^\circ \cos 30^\circ + \cos 45^\circ \sin 30^\circ = (1/\sqrt{2})(\sqrt{3}/2) + (1/\sqrt{2})(1/2) = (\sqrt{3} + 1)/(2\sqrt{2}) = (\sqrt{6} + \sqrt{2})/4.$$

Q5. Answer: B

$$\text{Double-angle: } \sin 2x = 2 \sin x \cos x.$$

Q6. Answer: B

$$1/2 = \sin(\pi/6). \text{ For } \sin x = \sin \alpha: x = n\pi + (-1)^n \alpha. \text{ So } x = n\pi + (-1)^n (\pi/6).$$

Q7. Answer: B

$$\cos \text{ is an even function: } \cos(-\theta) = \cos \theta. \text{ So } \cos(-60^\circ) = \cos 60^\circ = 1/2.$$

Q8. Answer: B

$$1 + \tan^2 x = \sec^2 x = 1 + 9/16 = 25/16, \text{ so } |\sec x| = 5/4, |\cos x| = 4/5. \text{ In Q3 } \cos \text{ negative } \Rightarrow \cos x = -4/5. \text{ Then } \sin x = \tan x \cdot \cos x = (3/4)(-4/5) = -3/5.$$

Q9. Answer: C

$$A = \frac{1}{2} r^2 \theta = \frac{1}{2} \times 36 \times \pi/3 = 6\pi \text{ cm}^2.$$

Q10. Answer: B

$$\text{Standard formula: } \cos(A + B) = \cos A \cos B - \sin A \sin B \text{ (note the MINUS).}$$

Q11. Answer: B

$$\text{Period of } \sin(kx) = 2\pi/|k|. \text{ Here } k = 4, \text{ so period} = 2\pi/4 = \pi/2.$$

Q12. Answer: A

$$\tan 15^\circ = \tan(45^\circ - 30^\circ) = (\tan 45^\circ - \tan 30^\circ)/(1 + \tan 45^\circ \tan 30^\circ) = (1 - 1/\sqrt{3})/(1 + 1/\sqrt{3}) = (\sqrt{3} - 1)/(\sqrt{3} + 1) \times (\sqrt{3} - 1)/(\sqrt{3} - 1) = (\sqrt{3} - 1)^2/2 = (4 - 2\sqrt{3})/2 = 2 - \sqrt{3}.$$

Q13. Answer: B

$$\sin \theta = \cos \theta \Rightarrow \tan \theta = 1 \Rightarrow \theta = \pi/4 \text{ in } (0, \pi/2).$$

Q14. Answer: B

$$\sin x \in [-1, 1], \text{ so } 3 \sin x \in [-3, 3].$$

Q15. Answer: B

$\cos 2x = 1 - 2 \sin^2 x$ (one of the three standard forms).