

EXAM-DAY · 90-MIN REVISION CARD

Trigonometric Functions

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

Degree $\leftrightarrow$ Radian: π rad = 180° .
 $d^\circ = d \times (\pi/180)$ rad; rad $\rightarrow$ degrees: $\times (180/\pi)$.

Arc length: $s = r\theta$. Sector area:
 $A = \frac{1}{2} r^2 \theta$. (θ in RADIANS).

Unit-circle definitions: $\cos \theta = x$, $\sin \theta = y$. $\tan \theta = y/x$. $\cot = 1/\tan$, $\sec = 1/\cos$, $\operatorname{cosec} = 1/\sin$.

ASTC (quadrants Q1-Q4): All / Sin / Tan / Cos positive.

Pythagorean identities: $\sin^2 \theta + \cos^2 \theta = 1$; $1 + \tan^2 \theta = \sec^2 \theta$;
 $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$.

Allied angles: $\sin(-\theta) = -\sin \theta$,
 $\cos(-\theta) = \cos \theta$. $\sin(\pi/2 - \theta) = \cos \theta$. $\sin(\pi - \theta) = \sin \theta$;
 $\cos(\pi - \theta) = -\cos \theta$.

Sum/Diff: $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$; $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$; $\tan(A \pm B) = (\tan A \pm \tan B)/(1 \mp \tan A \tan B)$.

Double angle: $\sin 2A = 2 \sin A \cos A$; $\cos 2A = \cos^2 A - \sin^2 A = 1 - 2 \sin^2 A = 2 \cos^2 A - 1$; $\tan 2A = 2 \tan A/(1 - \tan^2 A)$.

Triple angle: $\sin 3A = 3 \sin A - 4 \sin^3 A$; $\cos 3A = 4 \cos^3 A - 3 \cos A$; $\tan 3A = (3 \tan A - \tan^3 A)/(1 - 3 \tan^2 A)$.

Sum-to-product: $\sin C + \sin D = 2 \sin((C+D)/2) \cos((C-D)/2)$;
 $\cos C + \cos D = 2 \cos((C+D)/2) \cos((C-D)/2)$;
 $\cos C - \cos D = -2 \sin((C+D)/2) \sin((C-D)/2)$.

General solutions: $\sin x = \sin \alpha \Rightarrow x = n\pi + (-1)^n \alpha$; $\cos x = \cos \alpha \Rightarrow x = 2n\pi \pm \alpha$; $\tan x = \tan \alpha \Rightarrow x = n\pi + \alpha$ ($n \in \mathbb{Z}$).

Periods: $\sin, \cos \rightarrow 2\pi$; $\tan, \cot \rightarrow \pi$; $\sec, \operatorname{cosec} \rightarrow 2\pi$.

TOP 5 PYQ PATTERNS

1 Degree-radian conversion / arc-length / sector-area

2 marks · 88% of years

π rad = 180° ; check θ in radians before $s = r\theta$.

2 Find remaining ratios given one ratio + quadrant

3 marks · 82% of years

$\sin^2 + \cos^2 = 1$, then ASTC fixes the sign.

3 Prove a trig identity

3 marks · 78% of years

Start from the complex side; use sum-to-product / double-angle.

4 General solution of a trig equation

3 marks · 70% of years

Reduce to $\sin/\cos/\tan = \text{standard}$, then quote correct general-solution formula.

5 Evaluate $\sin 75^\circ$, $\cos 15^\circ$ using sum/difference

4 marks · 65% of years

Write $75^\circ = 45^\circ + 30^\circ$; apply $\sin(A+B)$; rationalise.

90-MIN REVISION FLOW

0-10 min

Re-write degree $\leftrightarrow$ radian table and the unit-circle ($\cos, \sin$) at 0, $\pi/6$, $\pi/4$, $\pi/3$, $\pi/2$ from memory.

10-25 min

Drill 6 arc-length / sector-area numericals from NCERT exercise 3.1.

25-45 min

Practice 'given one ratio + quadrant' problems — 5 questions across all 4 quadrants. Confirm ASTC signs.

45-65 min

Prove 4 identities using sum-to-product + double-angle. Time-box 5 min each.

65-80 min

Solve 4 general-solution trig equations (one each of $\sin, \cos, \tan$, mixed). State $n \in \mathbb{Z}$.

80-90 min

Self-quiz: 5 MCQs from drill. Mark misconceptions to revisit tomorrow.

Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning.
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