

INKMATHS FLASHCARDS

Trigonometry identities and equations

7 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in precise wording, the standard results the formulae booklet does not print, a check-yourself question per topic, and the slips that lose marks. The same cards run on the website with spaced-repetition scheduling, at inkphysics.co.uk/maths/flashcards.

STANDARD RESULT

The other two Pythagorean identities:

$\sec^2 \theta = ?$, $\operatorname{cosec}^2 \theta = ?$

TRIGONOMETRY: IDENTITIES AND EQUATIONS

STANDARD RESULT

$\cos 2\theta$, all three forms:

$\cos 2\theta = ?$

TRIGONOMETRY: IDENTITIES AND EQUATIONS

STANDARD RESULT

Small angle approximations, θ in radians only:

$\sin \theta \approx ?$, $\cos \theta \approx ?$, $\tan \theta \approx ?$

TRIGONOMETRY: IDENTITIES AND EQUATIONS

RECALL

State how to find R and α in the harmonic form.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

RECALL

State what to do with the interval when the equation contains $2x$.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

SPOT THE ERROR

Say what is wrong with this claim:

The sine rule gives $\sin B = 0.6$, so $B = 36.9^\circ$ and the triangle is settled.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

SPOT THE ERROR

Say what is wrong with this claim:

$\sin 2\theta$ is $2 \sin \theta$.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

STANDARD RESULT

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

TRIGONOMETRY: IDENTITIES AND EQUATIONS

STANDARD RESULT

$$1 + \tan^2 \theta, 1 + \cot^2 \theta$$

TRIGONOMETRY: IDENTITIES AND EQUATIONS

RECALL

Expand $R \sin(\theta + \alpha)$ and match coefficients. R is the square root of the sum of their squares, and $\tan \alpha$ is the cos coefficient over the sin one. Take R positive and read α 's quadrant off the signs of the two coefficients: acute only when both are positive, and $-3 \sin \theta + 4 \cos \theta$ needs 126.9° . Maximum R and minimum $-R$ follow.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

STANDARD RESULT

$$\theta, 1 - (\theta^2)/(2), \theta$$

TRIGONOMETRY: IDENTITIES AND EQUATIONS

SPOT THE ERROR

$180^\circ - 36.9^\circ = 143.1^\circ$ has the same sine, so there are two triangles unless the data rules one out. Check whether the obtuse option still leaves the angles summing under 180° , and whether the side opposite is long enough. The cosine rule never has this problem, because cosine is negative for obtuse angles and picks one answer.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

RECALL

Widen it first. If x runs over 0 to 360 degrees then $2x$ runs over 0 to 720, so solve for $2x$ across the wider range and halve every answer at the end. Solve in the original range and you find half the solutions and lose half the marks.

TRIGONOMETRY: IDENTITIES AND EQUATIONS

SPOT THE ERROR

$\sin 2\theta = 2 \sin \theta \cos \theta$. Trig functions do not come out of a bracket like a factor. Try $\theta = 30^\circ$. $\sin 60^\circ$ is about 0.87, while $2 \sin 30^\circ$ is exactly 1. The same goes for $\cos 2\theta$ and $\tan 2\theta$, which have their own double angle formulae.

TRIGONOMETRY: IDENTITIES AND EQUATIONS