Year 11 Mathematics Extension 1

Topic: Further Trigonometry (4 of 4)
Review Questions: Mixed One-off Exam Questions
Term 3, 2026

How to use this set

These are real past-paper questions on further trigonometry that do not fit any one recurring pattern: genuine one-offs. They are here so you also meet the rarer, less predictable exam questions. Work through them once you are solid on the patterns in the main review docs. Every question you get wrong or struggle with goes in your **Mistakes Log**.

Contents

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Q1 2020 Fort St Prelim Q7 · **1 mark**

What is the exact value of

$$\tan\left(\frac{\pi}{180}\right)\tan\left(\frac{2\pi}{180}\right)\tan\left(\frac{3\pi}{180}\right)\cdots\tan\left(\frac{88\pi}{180}\right)\tan\left(\frac{89\pi}{180}\right)?$$

(A) -1

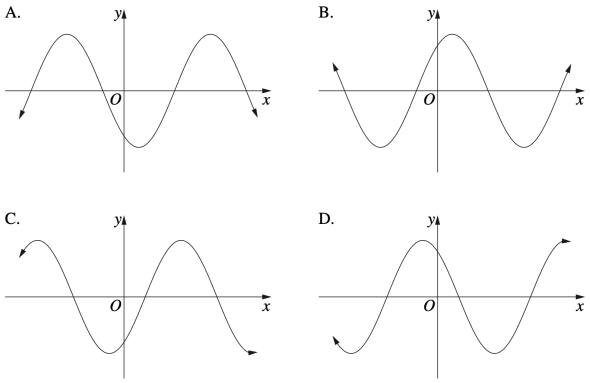
(B) 0

(C) 1

(D) Not defined

Q2 2021 HSC Q7 · **1 mark**

Which curve best represents the graph of the function $f(x) = -a\sin x + b\cos x$ given that the constants a and b are both positive?



Q3 2020 Sydney Girls Prelim Q3(e) · **3 marks**

Let A, B and C be the three angles of a triangle.

(i) Prove that $\tan(A+B) = -\tan C$.

(ii) Hence, or otherwise, prove that $\tan A + \tan B + \tan C = \tan A \tan B \tan C$.

Q4 2023 Blacktown Boys Prelim Q13(c) · **3 marks**

(i) Show that $\cos 3A = 4\cos^3 A - 3\cos A$.

(ii) Hence show that if $2\cos A = x + \dfrac{1}{x}$, then $2\cos 3A = x^3 + \dfrac{1}{x^3}$.

Q5 2023 Baulkham Hills Trial Q11(e) · **4 marks**

(i) Prove $\cot\theta - 2\cot 2\theta = \tan\theta$.

(ii) Hence, or otherwise, prove $\tan\theta + 2\tan 2\theta + 4\tan 4\theta = \cot\theta - 8\cot 8\theta$.

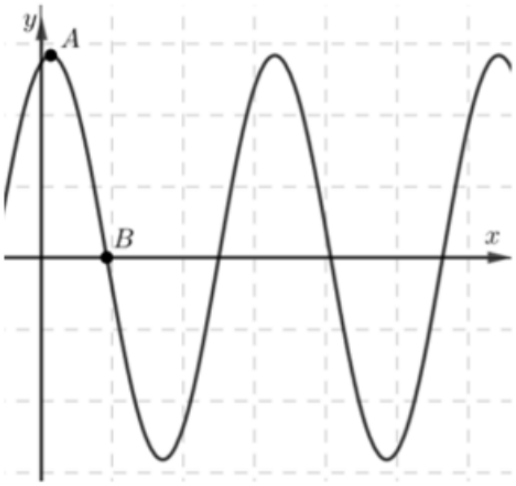
Q6 2022 Sydney Girls Trial Q12(b) · **4 marks**

(i) Express $f(x) = \sqrt{3}\cos x - \sin x$ in the form $R\cos(x+\alpha)$, where $0 < \alpha < \dfrac{\pi}{2}$.

(ii) Sketch $y = f(x)$ for $0 \le x \le 2\pi$, showing clearly the location of all stationary points and the end-points.

Q7 2024 Manly Trial Q14(e) · **4 marks**

The graph of $y = \sqrt{3}(\cos 2x + \sin 2x) - (\sin 2x - \cos 2x)$ is shown.



(i) Find the coordinates of A and B as labelled on the graph, given A is the maximum point on the graph and B is where the graph intersects the x-axis, without using calculus.

(ii) Hence or otherwise, solve

$$\sqrt{3}(\cos 2x + \sin 2x) - (\sin 2x - \cos 2x) = 2\sqrt{2} \quad \text{for } 0 \le x \le 2\pi.$$

Q8 2021 Hurlstone Trial Q14(e) · **5 marks**

(i) Prove that

$$\tan(A+B+C)=\frac{\tan A+\tan B+\tan C-\tan A\tan B\tan C}{1-\tan A\tan B-\tan B\tan C-\tan C\tan A}.$$

(ii) Given A, B and C are acute angles of a triangle and

$$\frac{\tan A}{5}=\frac{\tan B}{6}=\frac{\tan C}{7}=k,$$

hence or otherwise show that $k=\sqrt{\frac{3}{35}}$ is the only solution to $\tan(A+B+C)=0$.