Year 11 Mathematics Advanced

Topic: Trigonometry and Measure of Angles (5 of 5)
Review Questions (Worked Solutions): Mixed one-off exam questions
Term 3, 2026

Mixed one-off exam questions

Q1 Sydney Grammar 2021 Prelim Q7 · 1 mark

Given the functions $y = \tan x$ and $y = -\cos x$, which of the following is a true statement? (multiple choice)

Criteria	Marks
Correct option (D)	1

Solution.

A function f is even if $f(-x) = f(x)$ and odd if $f(-x) = -f(x)$. For $y = \tan x$,

$$\tan(-x) = -\tan x,$$

so $y = \tan x$ is odd. For $y = -\cos x$, using $\cos(-x) = \cos x$,

$$-\cos(-x) = -\cos x,$$

so $y = -\cos x$ is even. Hence $y = \tan x$ is odd and $y = -\cos x$ is even. The answer is **(D)**.

Q2 Killara 2023 Prelim Q8 · 1 mark

If $A + B = 180°$, which of the following is true: I. $\sin A = \sin B$, II. $\cos A = \cos B$, III. $\tan A = \tan B$? (multiple choice)

Criteria	Marks
Correct option (A)	1

Solution.

Since $A + B = 180°$, the angles are supplementary, so $B = 180° - A$. Using the supplementary-angle relations:

$$\sin(180° - A) = \sin A, \qquad \cos(180° - A) = -\cos A, \qquad \tan(180° - A) = -\tan A.$$

Therefore $\sin A = \sin B$ (I is true), while $\cos A = -\cos B$ and $\tan A = -\tan B$, so II and III fail in general. Only statement I holds. The answer is **(A)**.

Q3 Hurlstone 2022 Prelim Q10 · **1 mark**

An arc on the unit circle has length $\dfrac{4\pi}{9}$ units. What is the size of the angle subtended at the centre of the unit circle by this arc, in degrees? (multiple choice)

Criteria	Marks
Correct option (A)	1

Solution.

For an arc of length ℓ on a circle of radius r, the angle subtended at the centre (in radians) is $\theta = \dfrac{\ell}{r}$. On the unit circle $r = 1$, so

$$\theta = \frac{4\pi}{9} \text{ radians.}$$

Converting to degrees,

$$\theta = \frac{4\pi}{9} \times \frac{180^\circ}{\pi} = 80^\circ.$$

The answer is **(A)**.

Q4 Barker 2024 Trial Q31 · **1 mark**

A line L_1 passes through the origin $(0, 0)$ and the point $\left(1, \sqrt{3}\right)$. Find the acute angle of inclination of the line L_1 with the x-axis.

Criteria	Marks
Finds the gradient $m = \sqrt{3}$	1

Solution.

The gradient of L_1 is

$$m = \frac{\sqrt{3} - 0}{1 - 0} = \sqrt{3}.$$

The angle of inclination θ with the positive x-axis satisfies $\tan\theta = m$, so

$$\tan\theta = \sqrt{3} \quad \Rightarrow \quad \theta = 60^\circ.$$

The acute angle of inclination is 60°.

Q5 Fort St 2020 Trial Q6 · **1 mark**

At what angle is the line $y = -\sqrt{3}\,x$ inclined to the positive side of the x-axis? (multiple choice)

Criteria	**Marks**
Correct option (C)	1

Solution.

The angle of inclination θ (measured anticlockwise from the positive x-axis, with $0° \leq \theta < 180°$) satisfies $\tan\theta = m$, where m is the gradient. Here $m = -\sqrt{3}$, so

$$\tan\theta = -\sqrt{3}.$$

Since the gradient is negative, the inclination is obtuse. The related acute angle has $\tan^{-1}\sqrt{3} = 60°$, so

$$\theta = 180° - 60° = 120°.$$

The answer is **(C)**.