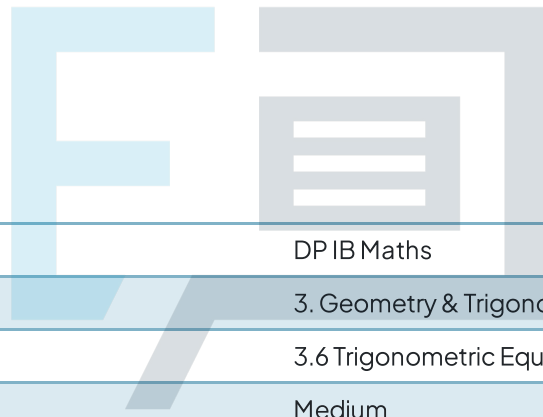




3.6 Trigonometric Equations & Identities

Question Paper



Course	DP IB Maths
Section	3. Geometry & Trigonometry
Topic	3.6 Trigonometric Equations & Identities
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Maths AA SL
Students of other boards may also find this useful

Question 1

The value of $\sin \alpha = \frac{3}{7}$ for $0 \leq \alpha \leq \frac{\pi}{2}$. Find:

- (i)
 $\cos \alpha$
- (ii)
 $\sin 2\alpha$
- (iii)
 $\cos 2\alpha$
- (iv)
 $\tan 2\alpha$.

[6 marks]



Exam Papers Practice

Question 2

The value of $\cos B = \frac{1}{5}$, for $\frac{3\pi}{2} \leq B \leq 2\pi$. Find:

- (i)
 $\cos 2B$
- (ii)
 $\sin 2B$
- (iii)
 $\tan 2B$.

[6 marks]

Question 3

An angle M has the properties such that $\sin M = r$ and $\sin 2M = s$. Find, in terms of r and s , an expression for:

- (i)
 $\cos M$
- (ii)
 $\tan M$.

Exam Papers Practice [4 marks]

Question 4

Solve the equation $2 \sin 2\theta = 1$ for $0^\circ \leq \theta \leq 360^\circ$.

[3 marks]

Question 5

Solve the equation $2 \sin x = \frac{1}{\sin x}$ for $0^\circ \leq x \leq 360^\circ$.

[5 marks]



Exam Papers Practice

Question 6a

Show that $(x + 1)(x - 2)(x - 3) = x^3 - 4x^2 + x + 6$.

[2 marks]

Question 6b

Use your result from part (a) to solve the equation

$$\tan^3 x - 4\tan^2 x + \tan x + 6 = 0$$

in the interval $0^\circ \leq x \leq 360^\circ$.

[5 marks]



Question 7a

Show that the equation $2 \sin^2 x + 3 \cos x = 0$ can be written in the form $a \cos^2 x + b \cos x + c = 0$, where a , b and c are integers to be found.

Exam Papers Practice [2 marks]

Question 7b

Hence, or otherwise, solve the equation $2 \sin^2 x + 3 \cos x = 0$ for $-180^\circ \leq x \leq 180^\circ$.

[3 marks]

Question 8a

Show that the equation

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

can be written in the form

$$2 \sin^2 x + \sin x - 1 = 0$$

[1 mark]

Question 8b

Hence, solve the equation $2 \cos^2 x - \sin x = 1$, for $0 \leq x \leq 4\pi$

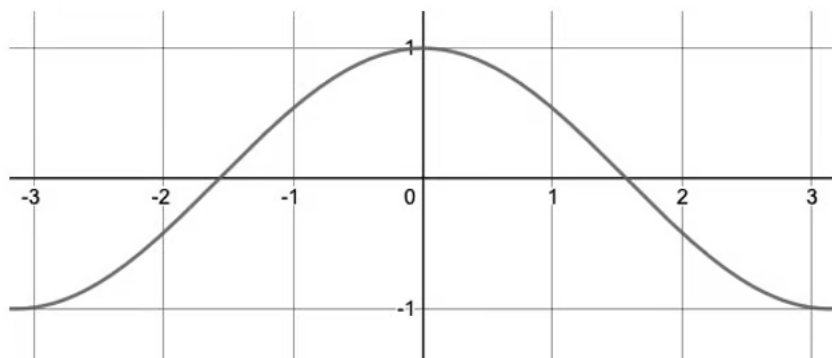
[5 marks]



Exam Papers Practice

Question 9a

The graph below shows the function $y = f(x)$ where $f(x) = \cos x$ for $-\pi \leq x \leq \pi$.



The function $g(x)$ is formed by translating the function $f(x)$ 1 unit vertically downwards.

The function $h(x)$ is formed by stretching the function $f(x)$ by a factor of $\frac{1}{2}$ in the y direction. The domain of $h(x)$ remains the same as $f(x)$.

- (i)
Sketch the functions $y = h(x)$ and $y = g(x)$.
- (ii)
State the number of roots for $g(x)$.

[4 marks]

Exam Papers Practice

Question 9b

Find the solutions to the equation $\cos 2x = \cos x - 1$, for $-\pi \leq x \leq \pi$, and label them clearly on the graph of $y = f(x)$ given above.

[4 marks]