# Revision – Unit5 Trigonometry

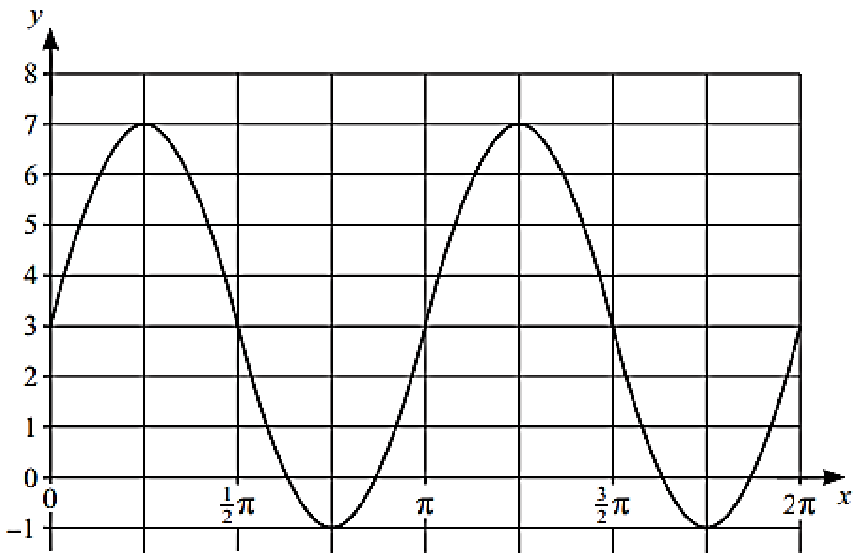
(Angles between 0° and 90°, The general definition of an angle, Trigonometric ratios of general angles, Graphs of trigonometric functions, Inverse trigonometric functions, Trigonometric equations ,Trigonometric identities, Further trigonometric equations)

**(a)** It is given that $\beta$ is an angle between 90° and 180° such that $\sin\beta = a$. Nov/9709/11/2024/Q8

Express $\tan^2\beta - 3\sin\beta\cos\beta$ in terms of $a$. [3]

**(b)** Solve the equation $\sin^2\theta + 2\cos^2\theta = 4\sin\theta + 3$ for $0° < \theta < 360°$. [5]

Nov/9709/12/2024/Q1




The diagram shows the curve with equation $y = a\sin(bx) + c$ for $0 \leqslant x \leqslant 2\pi$, where $a$, $b$ and $c$ are positive constants.

**(a)** State the values of $a$, $b$ and $c$. **[3]**

**(b)** For these values of $a$, $b$ and $c$, determine the number of solutions in the interval $0 \leqslant x \leqslant 2\pi$ for each of the following equations:

**(i)** $a\sin(bx) + c = 7 - x$ **[1]**

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**(ii)** $a\sin(bx) + c = 2\pi(x - 1)$. **[1]**

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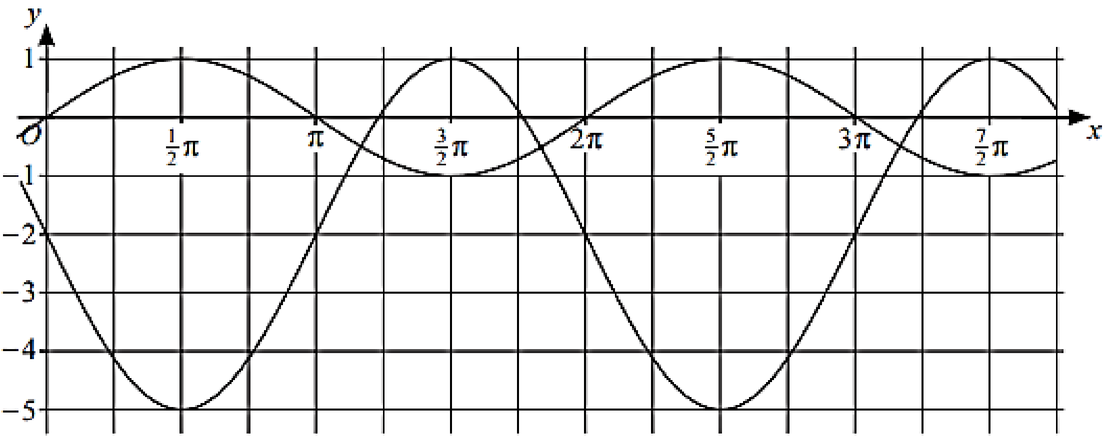
Find the exact solution of the equation

$$\cos\frac{1}{6}\pi + \tan 2x + \frac{\sqrt{3}}{2} = 0 \text{ for } -\frac{1}{4}\pi < x < \frac{1}{4}\pi.$$ [2]

Nov/9709/13/2024/Q2

Solve the equation $4\sin^4\theta + 12\sin^2\theta - 7 = 0$ for $0° \leqslant \theta \leqslant 360°$. [4]

Nov/9709/13/2024/Q4




June/9709/11/2024/Q2

The diagram shows two curves. One curve has equation $y = \sin x$ and the other curve has equation $y = \text{f}(x)$.

**(a)** In order to transform the curve $y = \sin x$ to the curve $y = \text{f}(x)$, the curve $y = \sin x$ is first reflected in the $x$-axis.

Describe fully a sequence of two further transformations which are required. [4]

**(b)** Find $\text{f}(x)$ in terms of $\sin x$. [2]

**(a)** Prove the identity $\frac{\sin^2 x - \cos x - 1}{1 + \cos x} \equiv -\cos x$. [3] June/9709/11/2024/Q5

**(b)** Hence solve the equation $\frac{\sin^2 x - \cos x - 1}{2 + 2\cos x} = \frac{1}{4}$ for $0° \leqslant x \leqslant 360°$. [3]

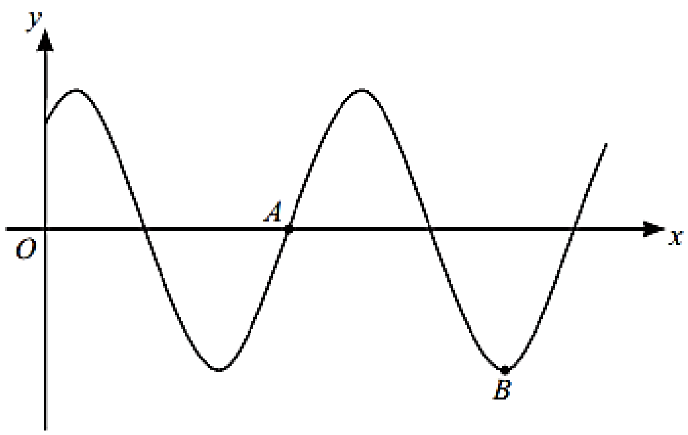
**(a)** Show that the equation $\frac{7\tan\theta}{\cos\theta} + 12 = 0$ can be expressed as June/9709/12/2024/Q3

$$12\sin^2\theta - 7\sin\theta - 12 = 0.$$ [3]

**(b)** Hence solve the equation $\frac{7\tan\theta}{\cos\theta} + 12 = 0$ for $0° \leqslant \theta \leqslant 360°$. [3]

**(a)**

June/9709/13/2024/Q2

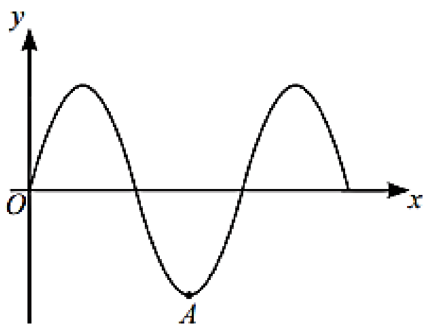



The diagram shows the curve $y = k\cos(x - \frac{1}{6}\pi)$ where $k$ is a positive constant and $x$ is measured in radians. The curve crosses the $x$-axis at point $A$ and $B$ is a minimum point.

Find the coordinates of $A$ and $B$. [3]

**(b)** Find the exact value of $t$ that satisfies the equation

$$3\sin^{-1}(3t) + 2\cos^{-1}\left(\tfrac{1}{2}\sqrt{2}\right) = \pi.$$ [2]




March /9709/ 12/2024/Q2

The diagram shows part of the curve with equation $y = k\sin\frac{1}{2}x$ , where $k$ is a positive constant and $x$ is measured in radians. The curve has a minimum point $A$.

**(a)** State the coordinates of $A$. [1]

**(b)** A sequence of transformations is applied to the curve in the following order.

Translation of 2 units in the negative $y$-direction

Reflection in the $x$-axis

Find the equation of the new curve and determine the coordinates of the point on the new curve corresponding to $A$. [3]

**(a)** Prove that $\dfrac{(\sin\theta + \cos\theta)^2 - 1}{\cos^2\theta} \equiv 2\tan\theta$. **[3]**

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**(b)** Hence solve the equation $\dfrac{(\sin\theta + \cos\theta)^2 - 1}{\cos^2\theta} = 5\tan^3\theta$ for $-90^\circ < \theta < 90^\circ$. **[3]**