

- 6 (a)** Using the expansions of $\sin(3x + 2x)$ and $\sin(3x - 2x)$, show that

$$\frac{1}{2}(\sin 5x + \sin x) \equiv \sin 3x \cos 2x. \quad [3]$$

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7 (a) Show that $\cos^4 \theta - \sin^4 \theta \equiv \cos 2\theta$.

[3]

[illegible]

- 2** Solve the equation $\cos(\theta - 60^\circ) = 3 \sin \theta$, for $0^\circ \leq \theta \leq 360^\circ$. [5]

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7 Let $f(x) = 8x^3 + 54x^2 - 17x - 21$.

(a) Show that $x + 7$ is a factor of $f(x)$.

[1]

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(b) Find the quotient when $f(x)$ is divided by $x + 7$.

[2]

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for $0^\circ \leq \theta \leq 360^\circ$.

[3]

[illegible]

- 4** Solve the equation $2 \cos x - \cos \frac{1}{2}x = 1$ for $0 \leq x \leq 2\pi$.

[5]

[illegible]

- [5]

[illegible]

5 (a) Show that $\frac{\cos 3x}{\sin x} + \frac{\sin 3x}{\cos x} = 2 \cot 2x$.

[4]

[illegible]

[illegible]

5 Solve the equation $\sin \theta = 3 \cos 2\theta + 2$, for $0^\circ \leq \theta \leq 360^\circ$.

[5]

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- [illegible]

- 3** By first expressing the equation $\tan(x + 45^\circ) = 2 \cot x + 1$ as a quadratic equation in $\tan x$, solve the equation for $0^\circ < x < 180^\circ$. [6]

[illegible]

- The angles α and β lie between 0° and 180° and are such that

$$\tan(\alpha + \beta) = 2 \quad \text{and} \quad \tan \alpha = 3 \tan \beta.$$

Find the possible values of α and β .

Find the possible values of α and β . [6]

[illegible]

$$\sin\left(x + \frac{1}{6}\pi\right) - \sin\left(x - \frac{1}{6}\pi\right) = \cos\left(x + \frac{1}{3}\pi\right) - \cos\left(x - \frac{1}{3}\pi\right),$$

find the exact value of $\tan x$. [4]

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for $0 \leq x \leq 2\pi$.

[2]

[illegible]

- (b)** Hence solve the equation $\sin 2\theta + \cos 2\theta = 2 \sin^2 \theta$ for $0^\circ < \theta < 180^\circ$.

[4]

[3]

[illegible]

[illegible]

- [illegible]

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