

- 3 (a) Given that $\cos(x - 30^\circ) = 2 \sin(x + 30^\circ)$, show that $\tan x = \frac{2 - \sqrt{3}}{1 - 2\sqrt{3}}$. [4]

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- (b) Hence solve the equation

$$\cos(x - 30^\circ) = 2 \sin(x + 30^\circ),$$

for $0^\circ < x < 360^\circ$.

[2]

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

[illegible]



- [illegible]

as a quadratic equation in $\tan \theta$, solve the equation for $0^\circ < \theta < 90^\circ$. [6]

$$\tan \theta \tan(\theta + 45^\circ) = 2 \cot 2\theta$$

as a quadratic equation in $\tan \theta$, solve the equation for $0^\circ < \theta < 90^\circ$. [6]

- $$\tan^2 \theta + 3\sqrt{3} \tan \theta - 2 = 0. \quad [3]$$

[3]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal dotted lines spaced evenly down the page. A large, light gray watermark is oriented diagonally from the bottom left towards the top right, displaying the text "pastpaperpenquinn.com". The background is white, and there are no other markings or text present.

$$\cot 2\theta + \cot \theta = 2$$

can be expressed as a quadratic equation in $\tan \theta$. [3]

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[illegible]

- $$4 \sin^4 \theta + 3 \sin^2 \theta - 1 = 0. \quad [3]$$

[3]

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- 6 (a)** Prove the identity $\cos 4\theta + 4 \cos 2\theta + 3 \equiv 8 \cos^4 \theta$.

[4]

[illegible]

[illegible]

- [6]

[illegible]

[illegible]

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for $0^\circ \leq \theta \leq 180^\circ$.

[5]

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[3]

[illegible]



[3]

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for $0^\circ < \theta < 180^\circ$.

[4]

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