

## Subunit 5.4: Trigonometric identities

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

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.

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

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### Topical Question No: 2

7 (a) Prove the identity  $\frac{1 + \sin \theta}{\cos \theta} + \frac{\cos \theta}{1 + \sin \theta} \equiv \frac{2}{\cos \theta}$ . [3]

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for letter height. The entire page is otherwise blank, with no margins, text, or other markings.

(b) Hence solve the equation  $\frac{1 + \sin \theta}{\cos \theta} + \frac{\cos \theta}{1 + \sin \theta} = \frac{3}{\sin \theta}$ , for  $0 \leq \theta \leq 2\pi$ . [3]

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### Topical Question No: 3

7 (a) Prove the identity  $\frac{1 - 2 \sin^2 \theta}{1 - \sin^2 \theta} \equiv 1 - \tan^2 \theta$ . [2]

[illegible]

(b) Hence solve the equation  $\frac{1 - 2 \sin^2 \theta}{1 - \sin^2 \theta} = 2 \tan^4 \theta$  for  $0^\circ \leq \theta \leq 180^\circ$ . [3]

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*Topical Question No: 4*

**10 (a)** Prove the identity  $\frac{1 + \sin x}{1 - \sin x} - \frac{1 - \sin x}{1 + \sin x} \equiv \frac{4 \tan x}{\cos x}$ . [4]

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(b) Hence solve the equation  $\frac{1 + \sin x}{1 - \sin x} - \frac{1 - \sin x}{1 + \sin x} = 8 \tan x$  for  $0 \leq x \leq \frac{1}{2}\pi$ . [3]

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*Topical Question No: 5*

4 (a) Prove the identity  $\frac{\sin^3 \theta}{\sin \theta - 1} - \frac{\sin^2 \theta}{1 + \sin \theta} \equiv -\tan^2 \theta (1 + \sin^2 \theta)$ . [4]

[illegible]

*Topical Question No: 6*

- 5 (a) Prove the identity  $\frac{\sin^2 x - \cos x - 1}{1 + \cos x} \equiv -\cos x$ . [3]

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

[illegible]