AQA Level 2 Further Mathematics Geometry I

Section 3: Trig graphs, identities and equations

Exercise

1. Using the identities $\sin^2 x + \cos^2 x = 1$ and/or $\tan x = \frac{\sin x}{\cos x}$, simplify

(i)
$$\frac{\sqrt{1-\cos^2 x}}{\tan x}$$

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 (ii) $\frac{\sin x}{\sqrt{1-\sin^2 x}}$ (iii) $\frac{\cos^2 x}{1+\sin x}$

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$$\frac{\cos^2 x}{1 + \sin x}$$

- 2. Solve the following equations for $0^{\circ} \le x \le 360^{\circ}$.
 - (i) $\sin x = 0.3$
 - (ii) $\tan x = 1.5$
 - (iii) $\cos x = -0.7$
 - (iv) $\sin x = -0.6$
- 3. Find all of the values for x between 0° and 360° such that
 - (i) $\sin x = 0.6$
 - (ii) $\cos x = 0.8$
 - (iii) $\tan x = -0.6$
 - (iv) $\cos x = -0.3$
- 4. Without using a calculator find values for x between 0° and 360° such that

(i)
$$\sin x = \frac{1}{\sqrt{2}}$$

(ii)
$$\sin x = -\frac{1}{2}$$

(iii)
$$\cos x = \frac{\sqrt{3}}{2}$$

(iv)
$$\cos x = -\frac{1}{\sqrt{2}}$$

- 5. Solve the following equations for x between 0° and 360° .
 - (i) $3 \sin x = 4 \cos x$
 - (ii) $2 \cos x = -3 \sin x$
- 6. Solve the following equations for θ in the range from 0° to 360° .
 - (i) $4\cos^2\theta = 3$
 - (ii) $2\cos^2\theta = \cos\theta$
 - (iii) $4 \sin \theta \cos \theta = \sin \theta$
 - (iv) $\cos^2 \theta \cos \theta 2 = 0$
 - (v) $3 \sin^2 \theta + 5 \cos \theta 1 = 0$
 - (vi) $3 \tan \theta 2 \cos \theta = 0$
- 7. Write down three angles that have the same tan as 132°.
- 8. Prove that $\frac{1}{1+\sin x} + \frac{1}{1-\sin x} = \frac{2}{\cos^2 x}$.