Trigonometric Identities

Specification: AQA 7357: E5 (proofs E8, A-level) · Edexcel 9MA0: 5.5

HOMEWORK Consolidation

1 Simplify
(a) $2 - 2\sin^2\theta$
(b) $\dfrac{1-\cos^2\theta}{\sin\theta\cos\theta}$
(c) $\sin^3\theta + \sin\theta\cos^2\theta$
AQA E5 · Edexcel 5.5 · L2

2 $\cos\theta = \dfrac{2}{3}$ and θ is reflex. Find exactly
(a) $\sin\theta$
(b) $\tan\theta$
AQA E5 · Edexcel 5.5 · L2

3 $\tan\theta = \dfrac{7}{24}$ and $180° < \theta < 270°$. Find exactly
(a) $\sin\theta$
(b) $\cos\theta$
AQA E5 · Edexcel 5.5 · L2

4 Prove that
$(1 + \sin\theta)^2 + \cos^2\theta \equiv 2(1 + \sin\theta)$.
AQA E8 (A-level) · Edexcel 5.5 · L2

5 $x = 7\sin\theta$ and $y = 2\cos\theta$. Eliminate θ to find an equation connecting x and y.
AQA E5 · Edexcel 5.5 · L2

6 Given that $3\sin\theta = 4\cos\theta$ and θ is acute, find
(a) $\tan\theta$
(b) the exact values of $\sin\theta$ and $\cos\theta$.
AQA E5 · Edexcel 5.5 · L2

7 No calculator. Find the exact values of
(a) $\sin 240°$
(b) $\tan 315°$
(c) $\cos(-150°)$
AQA E1/E3 · Edexcel 5.1/5.3 · L1

8 (a) Find the exact values of $\sin 150°$ and $\cos 150°$.
(b) Hence show that $\sin^2 150° + \cos^2 150° = 1$.
AQA E5 · Edexcel 5.5, AQA E1/E3 · Edexcel 5.1/5.3 · L2, L1

9 Use the graph of $y = \cos\theta$ to find all the values of θ in the interval $0° \le \theta \le 360°$ for which $\cos\theta = \cos 50°$.
AQA E3 · Edexcel 5.3 · Ch9 L6

10 (a) Describe the transformation that maps $y = \sin x$ onto $y = \sin(x + 90°)$.
(b) Explain why $\sin(x + 90°) \equiv \cos x$.
AQA E3 · Edexcel 5.3 · Ch9 L7

11 *AQA-style*. No calculator. θ is a reflex angle and $2\sin^2\theta = 3\cos\theta$.
(a) Show that $2\cos^2\theta + 3\cos\theta - 2 = 0$. [2 marks]
(b) Hence find the value of $\cos\theta$. [3 marks]
(c) Find θ and the exact value of $\sin\theta$. [2 marks]
AQA E5 · Edexcel 5.5, AQA E1/E3 · Edexcel 5.1/5.3 · L2, L1 · AQA-style

12 *Edexcel-style*. No calculator. In triangle PQR, $PR = 10$ cm, $QR = 7$ cm and angle $QPR = 30°$.
(a) Show that $\sin Q = \dfrac{5}{7}$. [2 marks]
(b) Given that angle Q is obtuse, find the exact value of $\cos Q$. [3 marks]
(c) Hence find the exact value of $\tan Q$. [1 mark]
AQA E5 · Edexcel 5.5, AQA E1 · Edexcel 5.1 · L2, Ch9 L2 · Edexcel-style