

**AQA, Edexcel, OCR**

**A Level**

# A Level Mathematics

Understand and use double  
angle formulae

Name:

**M M E**

Mathsmadeeasy.co.uk

Total Marks:

**C5- Understand and use double angle formulae; use of formulae for  $\sin(A \pm B)$ ,  $\cos(A \pm B)$ ,  $\tan(A \pm B)$ ; understand geometrical proofs of these formulae- Questions**

AQA, Edexcel, OCR

- 1) For the following questions  $\alpha$ ,  $\beta$  and  $\delta$  are all acute angles.

$$\sin(\alpha) = \frac{3}{5}$$

$$\cos(\beta) = \frac{2}{3}$$

$$\tan(\delta) = \frac{1}{4}$$

Find exact values for:

[8]

(a)  $\sin(\alpha + \beta)$       (b)  $\sin(\alpha - \beta)$       (c)  $\cos(\alpha + \beta)$       (d)  $\cos(\alpha + \delta)$

(e)  $\cos(\beta - \delta)$       (f)  $\tan(\alpha - \beta)$       (g)  $\tan(\alpha + \delta)$       (h)  $\tan(\beta + \delta)$

Find exact values for:

[8]

(i)  $\sin(2\alpha)$       (j)  $\cos(2\alpha)$       (k)  $\tan(2\alpha)$       (l)  $\sin(2\beta)$

(m)  $\cos(2\beta)$       (n)  $\tan(2\beta)$       (o)  $\sec(2\delta)$       (p)  $\operatorname{cosec}(2\delta)$

- 2) Demonstrate geometric proof of the double angle formula for

i) sine; and [5]

ii) use this solution to prove the respective rule for cosine. [4]

- 3) State the formula for  $\sin(A + B)$ ,  $\cos(A + B)$  and use these to write the formula for  $\tan(A + B)$ . [3]

- 4) Demonstrate, using your knowledge of trigonometric identities, that the following is true [3]

$$\cos 2A = 1 - 2 \sin^2 A$$

- 5) Show that  $\cos(3x) = 4 \cos^3(x) - 3 \cos(x)$  [2]

- 6) Simplify the following [2]

$$\frac{\cos(2x)}{\sin(x) + \cos(x)}$$