

Write your name here

Surname

Other Names

AS/A Level Mathematics

Addition and Double Angle Formulae

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled..
- Answer the questions in the spaces provided
– there may be more space than you need.
- You should show sufficient working to make your methods clear.
Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

- 1 (a) Use the identity for $\sin(A + B)$ to express $\sin 2A$ in terms of $\sin A$ and $\cos A$. (2)
- (b) Use the identity for $\cos(A + B)$ to express $\cos 2A$ in terms of $\sin A$ and $\cos A$. (2)
- (c) Hence, express $\cos 2A$ in terms of
- i) $\cos A$ (2)
 - ii) $\sin A$ (2)
- (d) Use the identity for $\tan(A + B)$ to express $\tan 2A$ in terms of $\tan A$. (2)

(Total for question 1 is 10 marks)

- 2 (a) By writing $\sin 3\theta$ as $\sin(2\theta + \theta)$ show that $\sin 3\theta = 3\sin\theta - 4\sin^3\theta$ (2)
- (b) Solve, for $0 \leq \theta \leq 180$, the equation, (4)

$$3\sin\theta - 4\sin^3\theta = 0.4$$

Give your answers to 1 decimal place.

(Total for question 2 is 6 marks)

- 3 (a) By writing $\cos 3\theta$ as $\cos(2\theta + \theta)$ show that $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$ (2)
- (b) Solve, for $0 \leq \theta \leq \pi$, the equation, (4)

$$4\cos^3\theta - 3\cos\theta = 0.5$$

Give your answers in terms of π .

(Total for question 3 is 6 marks)

- 4 Solve, for $-180 \leq x \leq 180$, the equation,

$$\cos 2x - 7 \sin x + 3 = 0$$

(Total for question 4 is 5 marks)

- 5 Solve, for $0 \leq x \leq 360$, the equation,

$$8 \sin x \cos x = 3$$

Give your answers to 1 decimal place.

(Total for question 5 is 5 marks)

- 6 Prove the identity:

$$\frac{\cos 2x}{\cos x + \sin x} \equiv \cos x - \sin x$$

(Total for question 6 is 2 marks)