



## Trigonometric Equations and Identities Exam Questions Sheet 2

### Q1.

Solve, for  $0 \leq x < 360^\circ$ ,

(a)  $\sin(x - 20^\circ) = \frac{1}{\sqrt{2}}$

(4)

(b)  $\cos 3x = -\frac{1}{2}$ .

(6)

(Total for question = 10 marks)

### Q2.

(a) Given that  $5\sin \theta = 2\cos \theta$ , find the value of  $\tan \theta$ .

(1)

(b) Solve, for  $0 \leq x < 360^\circ$ ,

$$5 \sin 2x = 2 \cos 2x,$$

giving your answers to 1 decimal place.

(5)

(Total 6 marks)

### Q3.

(i) Solve, for  $0 \leq \theta < 360^\circ$ , the equation

$$9\sin(\theta + 60^\circ) = 4$$

giving your answers to 1 decimal place.

You must show each step of your working.

(4)

(ii) Solve, for  $-180 \leq x < 180^\circ$ , the equation

$$2\tan x - 3\sin x = 0$$

giving your answers to 2 decimal places where appropriate.

[Solutions based entirely on graphical or numerical methods are not acceptable.]

(5)

(Total 9 marks)



**Q4.**

(a) Show that the equation

$$\cos^2 x = 8\sin^2 x - 6\sin x$$

can be written in the form

$$(3\sin x - 1)^2 = 2$$

(3)

(b) Hence solve, for  $0 \leq x < 360^\circ$ ,

$$\cos^2 x = 8\sin^2 x - 6\sin x$$

giving your answers to 2 decimal places.

(5)

**(Total for question = 8 marks)**

**Q5.**

(i) Solve, for  $0 \leq \theta < 180^\circ$

$$\sin(2\theta - 30^\circ) + 1 = 0.4$$

giving your answers to 1 decimal place.

(5)

(ii) Find all the values of  $x$ , in the interval  $0 \leq x < 360^\circ$ , for which

$$9\cos^2 x - 11\cos x + 3\sin^2 x = 0$$

giving your answers to 1 decimal place.

(7)

You must show clearly how you obtained your answers.

**(Total 12 marks)**

**Q6.**

(a) Show that

$$\frac{10\sin^2 \theta - 7\cos \theta + 2}{3 + 2\cos \theta} \equiv 4 - 5\cos \theta$$

(4)

(b) Hence, or otherwise, solve, for  $0 \leq x \leq 360^\circ$ , the equation

$$\frac{10\sin^2 x - 7\cos x + 2}{3 + 2\cos x} = 4 + 3\sin x$$

(3)

**(Total for question = 7 marks)**

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**Q7.**

(i) Solve, for  $-180^\circ \leq x < 180^\circ$ ,

$$\tan(x - 40^\circ) = 1.5$$

giving your answers to 1 decimal place.

(3)

(ii) (a) Show that the equation

$$\sin\theta \tan\theta = 3\cos\theta + 2$$

can be written in the form

$$4\cos^2\theta + 2\cos\theta - 1 = 0$$

(3)

(b) Hence solve, for  $0 \leq \theta < 360^\circ$ ,

$$\sin\theta \tan\theta = 3\cos\theta + 2$$

showing each stage of your working.

(5)

**(Total 11 marks)**

**Q8.**

(a) Show that the equation

$$\tan 2x = 5 \sin 2x$$

can be written in the form

$$(1 - 5 \cos 2x) \sin 2x = 0$$

(2)

(b) Hence solve, for  $0 \leq x \leq 180^\circ$ ,

$$\tan 2x = 5 \sin 2x$$

giving your answers to 1 decimal place where appropriate.

You must show clearly how you obtained your answers.

(5)

**(Total 7 marks)**