8. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

Given the first three terms of a geometric sequence are

$$2\sin\theta,\ \cos\theta \text{ and } 1+\sin\theta$$

where θ is a constant

(a) show that

$$3\sin^2\theta + 2\sin\theta - 1 = 0$$

(3)

Given that θ is acute,

(b) use trigonometric identities to find the exact value of the second term in the sequence.

(3)

(c) find the value of the 11th term in the sequence.

(3)

(Total for Question 8 is 9 marks)

---

9. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

Given that a and b are positive constants, solve the simultaneous equations

$$ab = 25$$

$$\log_4 a - \log_4 b = 3$$

Show each step of your working, giving exact values for a and b.

(4)

(Total for Question 9 is 4 marks)

---

10. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

The binomial expansion, in ascending powers of x, of $(1 + kx)^n$ is

$$1 + 36x + 567x^2 + px^3 + ...$$

where k and p are non-zero constants and n is an integer greater than 1.

(a) Use this information to set up and solve two simultaneous equations to find the value of k and the value of n.

(6)

(b) Hence find the value of p.

(2)

(Total for Question 10 is 8 marks)

TOTAL FOR PAPER IS 75 MARKS