

**Cumulative Test 2: 32 Marks**

1.

Find the first three terms, in ascending powers of  $x$ , of the binomial expansion of  $(3 + 2x)^5$ , giving each term in its simplest form.

**(4)**

**2.**

The points  $A$  and  $B$  have coordinates  $(5, -1)$  and  $(13, 11)$  respectively.

(a) Find the coordinates of the mid-point of  $AB$ .

**(2)**

Given that  $AB$  is a diameter of the circle  $C$ ,

(b) find an equation for  $C$ .

**(4)**

**3.**

(a) Show that the equation

$$5 \cos^2 x = 3(1 + \sin x)$$

can be written as

$$5 \sin^2 x + 3 \sin x - 2 = 0.$$

**(2)**

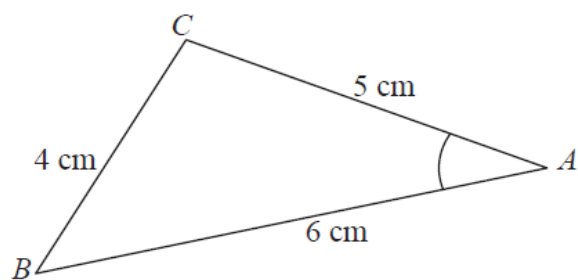
(b) Hence solve, for  $0 \leq x < 360^\circ$ , the equation

$$5 \cos^2 x = 3(1 + \sin x),$$

giving your answers to 1 decimal place where appropriate.

**(5)**

4.



**Figure 1**

Figure 1 shows the triangle  $ABC$ , with  $AB = 6$  cm,  $BC = 4$  cm and  $CA = 5$  cm.

(a) Show that  $\cos A = \frac{3}{4}$ .

(3)

(b) Hence, or otherwise, find the exact value of  $\sin A$ .

(2)

**5.**

Find the set of values of  $k$  for which the equation  $kx^2 + 3x - 4 + k = 0$  has no real roots. [4]

6.

$$f(x) = 2x^3 - 3x^2 - 39x + 20$$

- (a) Use the factor theorem to show that  $(x + 4)$  is a factor of  $f(x)$ .

(2)

- (b) Factorise  $f(x)$  completely.

(4)

(Total 6 marks)