

Year 1 Pure 1 Chapter 3: Simultaneous Equations – Exam Questions (Total Marks 52)

Q1. Solve the simultaneous equations

$$x + y = 2$$

$$4y^2 - x^2 = 11$$

(Total 7 marks)

Q2. Solve the simultaneous equations

$$y - 3x + 2 = 0$$

$$y^2 - x - 6x^2 = 0$$

(Total 7 marks)

Q3. Given the simultaneous equations

$$2x + y = 1$$

$$x^2 - 4ky + 5k = 0$$

where k is a non zero constant,

(a) show that

$$x^2 + 8kx + k = 0$$

(2)

Given that $x^2 + 8kx + k = 0$ has equal roots,

(b) find the value of k .

(3)

(c) For this value of k , find the solution of the simultaneous equations.

(3)

(Total 8 marks)

Q4.

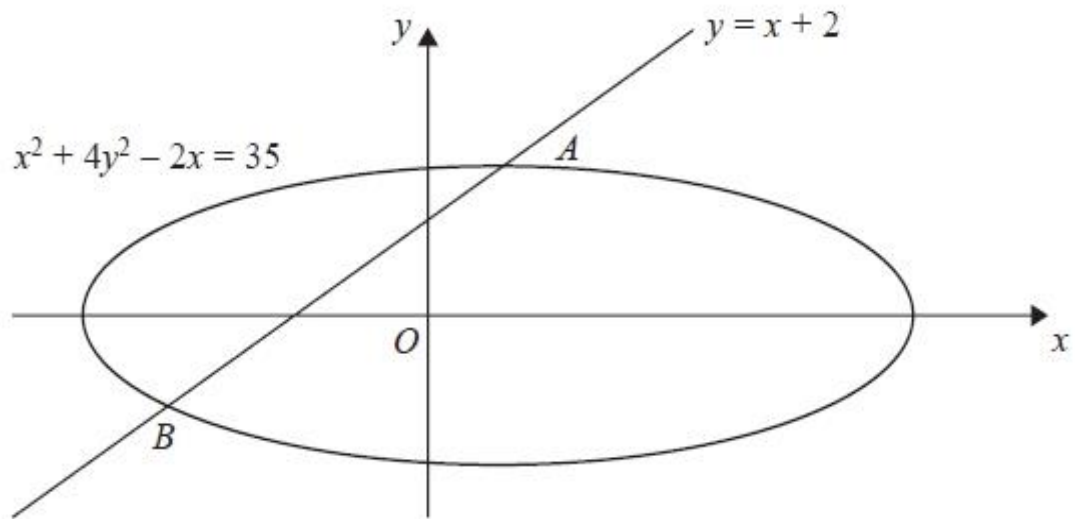


Figure 2

The line $y = x + 2$ meets the curve $x^2 + 4y^2 - 2x = 35$ at the points A and B as shown in Figure 2.

Find the coordinates of A and the coordinates of B.

(6)

(Total 6 marks)

Q5.

(a) By eliminating y from the equations

$$y = x - 4$$

$$2x^2 - xy = 8,$$

show that

$$x^2 + 4x - 8 = 0$$

(2)

(b) Hence, or otherwise, solve the simultaneous equations

$$y = x - 4,$$

$$2x^2 - xy = 8,$$

giving your answers in the form $a \pm b\sqrt{3}$, where a and b are integers.

(5)

(Total 7 marks)

Q6.

Given that

$$f(x) = 2x^2 + 8x + 3$$

(a) find the value of the discriminant of $f(x)$.

(2)

(b) Express $f(x)$ in the form $p(x + q)^2 + r$ where p , q and r are integers to be found.

(3)

The line $y = 4x + c$, where c is a constant, is a tangent to the curve with equation $y = f(x)$.

(c) Calculate the value of c .

(5)

(Total 10 marks)

Q7. Solve the simultaneous equations

$$y - 2x - 4 = 0$$

$$4x^2 + y^2 + 20x = 0$$

(Total for question = 7 marks)