PART 3

PAST EXAMINATION QUESTIONS : QUADRATIC INEQUALITIES

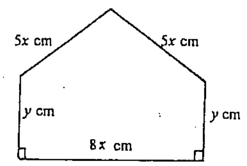
1. The equation of a curve is $y = 4x^2 - 8x - 5$. Find (i) the range of values of x for which $y \geq 0$, (ii) the co-ordinates of the turning point of the curve. State the co-ordinates of the maximum point of the curve $y = |4x^2 - 8x - 5|$ and sketch the curve $y = |4x^2 - 8x - 5|$. (N84/P2/13)

2. Find the range of values of x for which $x^2 + 2x \geq 15$. (Sp1/7)

3. State the minimum value of $(x-3)^2 + 2$, and the corresponding value of x. Sketch the curve $y = (x-3)^2 + 2$. (Sp1/15a)

4. Find the range of values of x for which $2x^2 - 3x \geq 2$. (J85/P1/12a)

5. A piece of wire, length 90 cm, is bent into the shape shown in the diagram. Show that the area, A cm^2, enclosed by the wire is given by $A = 360x - 60x^2$. Find the value of x and of y for which A is a maximum. (J85/P2/5)



6. (a) Find the range of values of x for which $6x^2 - 11x \geq 7$. (b) Find the co-ordinates of the turning point of the curve $y = (2x-3)^2 + 6$ and sketch the curve. (N86/P1/6)

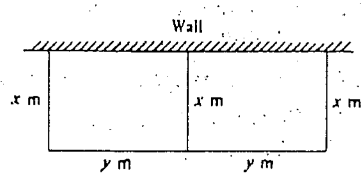
7. Find the range of values of x for which $2x^2 < 7x + 4$. (N87/P1/1)

8. State the maximum value of $4 - (x+1)^2$ and the corresponding value of x. Sketch the curve $y = 4 - (x+1)^2$ for $-2 \leq x \leq 2$. (N87/P1/17b)

9. Find the range of values of x for which $x > x^2 - 12$. (J88/P1/4b)

10. Find the range of values of x for which $x(2x-3) < x^2 - 2$. (N88/P1/6b)

11. A farmer has 120 m of fencing to make two identical rectangular enclosures using an existing wall as one side of each enclosure. The dimensions of each enclosure are x m and y m as shown. Obtain an expression, in terms of x only, for the total area of the two enclosures, and calculate the maximum value of this area. (N88/P1/10b)



1. (i) $x \geq -\frac{1}{2}, x \geq 2\frac{1}{2}$

(ii) $(1, -9); (1, 9)$

2. $x \leq -5, 3 \leq x$
3. 2, 3
4. $x \leq -\frac{1}{2}, 2 \leq x$
5. $x = 3, y = 18$
6. (a) $x \leq -\frac{1}{2}, 2\frac{1}{3} \leq x$

(b) $(1{\cdot}5, 6)$

7. $-\frac{1}{2} < x < 4$
8. 4, −1
9. $-3 < x < 4$
10. $1 < x < 2$
11. $x(120 - 3x)$, 1200 m^2