PAST EXAMINATION QUESTIONS: QUADRATIC INEQUALITIES

1. Find the range of values of x for which $2(x^2 - 2) > 7x$. (J99/P1/3)

2. Find the range of values of k for which the graph of $y = x^2 + (k - 4)x + 1$ lies entirely above the x-axis. (J99/P1/9)

3. Find the range of values of x for which $3(x + 1)^2 < 16x$. (N99/P1/2)

4. (a) Find the range of values of x for which $x^2 + 3x - 4 > 5x - 1$.

   (b) Find the range of values of c, given that, for all values of x, $x^2 - 5x + c > 2$.
   (J2000/P1/3)

5. Find the range of values of x for which $(2x + 1)(4 - x) > 4$. (N2000/P1/3b)

6. Given that $f(x) \equiv 2x^2 - 5x - 7$,

   (i) find the value of a, of b and of c for which $f(x) \equiv a(x - b)^2 - c$,

   (ii) state the minimum value of $f(x)$,

   (iii) sketch the graph of $y = |f(x)|$ for $-2 \le x \le 4.5$, indicating on your graph the coordinates of the stationary point and of the points where the graph meets the coordinate axes,

   (iv) calculate the values of x for which $|f(x)| = 7$, giving your answers to 2 decimal places where appropriate. (N2000/P1/17)

7. The function f is defined for the domain $-3 \le x \le 3$ by $f(x) = 4x^2 + 4x - 15$.

   (a) Express $f(x)$ in the form $a(x + b)^2 + c$, where a, b and c are constants.

   (b) Find the range of f corresponding to the given domain.

   (c) Find the solution set of x for which $f(x) > 0$.

   (d) State the coordinates of the turning point of the curve $y = |f(x)|$. (sp1/12 EITHER)

8. (i) Find the range of values of x for which $x^2 + 7x - 9 < 8x - 3$.

   (ii) Find the range of values of c for which $x^2 + 7x - 9 > 8x + c$, for all values of x.
   (J01/P1/9)

9. Find the range of values of x for which $x(2x + 5) > 12$. (N01/P1/7a)

10. Find the x-coordinate of the point on the line $y = 5 - 2x$ where xy is a maximum. (N01/P1/15a)

11. Find the value of a and b for which the solution set of the quadratic inequality $x^2 + ax > b$ is $\{x : x > 2\} \cup \{x : x < -4\}$.   (J2002/P2/9b)

1. $x < -\frac{1}{2}$ or $4 < x$

2. $2 < k < 6$

3. $\frac{1}{3} < x < 3$

4. (a) $x < -1$ or $x > 3$ (b) $c > 8\frac{1}{4}$

5. $0 < x < 3\frac{1}{2}$

6. (i) $a = 2, b = 1\frac{1}{4}, c = 10\frac{1}{8}$

   (ii) $-10\frac{1}{8}$

   (iii) $y = 2(x - 1\frac{1}{4})^2 - 10\frac{1}{8}$
$$= 2x^2 - 5x - 7$$

   (iv) $x = -1\cdot68, 0, 2\cdot5, 4\cdot18$

7. (i) $f(x) = 4(x + \frac{1}{2})^2 - 16$

   (ii) $-16 \le f(x) \le 33$

   (iii) If $f(x) > 0$ then $x < -2\frac{1}{2}$ or $1\frac{1}{2} < x$

   (iv) The turning point of $|f(x)|$ is $(-\frac{1}{2}, 16)$

8. (i) $-2 < x < 3$

   (ii) $c < -9\frac{1}{4}$

9. $x < -4$ or $1\frac{1}{2} < x$

10. $x = 1\frac{1}{4}$

11. $a = 2, b = 8$