Equations and Inequalities - Edexcel Past Exam Questions

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1. Solve the simultaneous equations

$$x + y = 2$$

$$x^2 + 2y = 12.$$

(6)
Jan 05 Q4

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2. Given that

$$f(x) = x^2 - 6x + 18, \quad x \geq 0,$$

(*a*) express f(*x*) in the form $(x - a)^2 + b$, where *a* and *b* are integers.

(3)

The curve *C* with equation *y* = f(*x*), *x* ≥ 0, meets the *y*-axis at *P* and has a minimum point at *Q*.

(*b*) Sketch the graph of *C*, showing the coordinates of *P* and *Q*.

(4)

The line *y* = 41 meets *C* at the point *R*.

(*c*) Find the *x*-coordinate of *R*, giving your answer in the form $p + q\sqrt{2}$, where *p* and *q* are integers.
(5)
Jan 05 Q10

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3. Solve the simultaneous equations

$$x - 2y = 1,$$

$$x^2 + y^2 = 29.$$

(6)
June 05 Q5

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4. Find the set of values of *x* for which

(*a*) $3(2x + 1) > 5 - 2x,$

(2)

(*b*) $2x^2 - 7x + 3 > 0,$

(4)

(*c*) **both** $3(2x + 1) > 5 - 2x$ **and** $2x^2 - 7x + 3 > 0.$
(2)
June 05 Q6

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5.   Find the set of values of x for which

$$x^2 - 7x - 18 > 0.$$ **(4)**
<div align="right">June 06 Q2</div>

6.   Solve the simultaneous equations

$$y = x - 2,$$

$$y^2 + x^2 = 10.$$ **(7)**
<div align="right">Jan 07 Q4</div>

7.   (*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)**
<div align="right">June 07 Q6</div>

8.   The curve C has equation $y = \dfrac{3}{x}$ and the line l has equation $y = 2x + 5$.

(*a*) Sketch the graphs of C and l, indicating clearly the coordinates of any intersections with the axes.

   (3)

(*b*) Find the coordinates of the points of intersection of C and l.   **(6)**
<div align="right">June 08 Q6</div>

9.   Find the set of values of x for which

(*a*) $4x - 3 > 7 - x$

   (2)

(b) $2x^2 - 5x - 12 < 0$

   (4)

(*c*) **both** $4x - 3 > 7 - x$ **and** $2x^2 - 5x - 12 < 0$ **(1)**
<div align="right">June 09 Q4</div>

10. Solve the simultaneous equations

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

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

(7)

Jan 10 Q5

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11. Find the set of values of x for which

(a) $3(x - 2) < 8 - 2x$,

(2)

(b) $(2x - 7)(1 + x) < 0$,

(3)

(c) both $3(x - 2) < 8 - 2x$ **and** $(2x - 7)(1 + x) < 0$.

(1)

June 10 Q3

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12. (a) On the axes below sketch the graphs of

(i) $y = x(4 - x)$,

(ii) $y = x^2(7 - x)$,

showing clearly the coordinates of the points where the curves cross the coordinate axes.

(5)

(b) Show that the x-coordinates of the points of intersection of

$$y = x(4 - x) \quad \text{and} \quad y = x^2(7 - x)$$

are given by the solutions to the equation $x(x^2 - 8x + 4) = 0$.

(3)

The point A lies on both of the curves and the x and y coordinates of A are both positive.

(c) Find the exact coordinates of A, leaving your answer in the form $(p + q\sqrt{3}, r + s\sqrt{3})$, where p, q, r and s are integers.

(7)

June 10 Q10

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13. Solve the simultaneous equations

$$x + y = 2$$

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

(7)

June 11 Q4