

ALGEBRA

1 Find the set of values of x for which

- a** $2x + 1 < 7$ **b** $3x - 1 \geq 20$ **c** $2x - 5 > 3$ **d** $6 + 3x \leq 42$
e $5x + 17 \geq 2$ **f** $\frac{1}{3}x + 7 < 8$ **g** $9x - 4 \geq 50$ **h** $3x + 11 < 7$
i $18 - x > 4$ **j** $10 + 4x \leq 0$ **k** $12 - 3x < 10$ **l** $9 - \frac{1}{2}x \geq 4$

2 Solve each inequality.

- a** $2y - 3 > y + 4$ **b** $5p + 1 \leq p + 3$ **c** $x - 2 < 3x - 8$
d $a + 11 \geq 15 - a$ **e** $17 - 2u < 2 + u$ **f** $5 - b \geq 14 - 3b$
g $4x + 23 < x + 5$ **h** $12 + 3y \geq 2y - 1$ **i** $16 - 3p \leq 36 + p$
j $5(r - 2) > 30$ **k** $3(1 - 2t) \leq t - 4$ **l** $2(3 + x) \geq 4(6 - x)$
m $7(y + 3) - 2(3y - 1) < 0$ **n** $4(5 - 2x) > 3(7 - 2x)$ **o** $3(4u - 1) - 5(u - 3) < 9$

3 Find the set of values of x for which

- a** $x^2 - 4x + 3 < 0$ **b** $x^2 - 4 \leq 0$ **c** $15 + 8x + x^2 < 0$ **d** $x^2 + 2x \leq 8$
e $x^2 - 6x + 5 > 0$ **f** $x^2 + 4x > 12$ **g** $x^2 + 10x + 21 \geq 0$ **h** $22 + 9x - x^2 > 0$
i $63 - 2x - x^2 \leq 0$ **j** $x^2 + 11x + 30 > 0$ **k** $30 + 7x - x^2 > 0$ **l** $x^2 + 91 \geq 20x$

4 Solve each inequality.

- a** $2x^2 - 9x + 4 \leq 0$ **b** $2r^2 - 5r - 3 < 0$ **c** $2 - p - 3p^2 \geq 0$
d $2y^2 + 9y - 5 > 0$ **e** $4m^2 + 13m + 3 < 0$ **f** $9x - 2x^2 \leq 10$
g $a^2 + 6 < 8a - 9$ **h** $x(x + 4) \leq 7 - 2x$ **i** $y(y + 9) > 2(y - 5)$
j $x(2x + 1) > x^2 + 6$ **k** $u(5 - 6u) < 3 - 4u$ **l** $2t + 3 \geq 3t(t - 2)$
m $(y - 2)^2 \leq 2y - 1$ **n** $(p + 2)(p + 3) \geq 20$ **o** $2(13 + 2x) < (6 + x)(1 - x)$

5 Giving your answers in terms of surds, find the set of values of x for which

- a** $x^2 + 2x - 1 < 0$ **b** $x^2 - 6x + 4 > 0$ **c** $11 - 6x - x^2 > 0$ **d** $x^2 + 4x + 1 \geq 0$

6 Find the value or set of values of k such that

- a** the equation $x^2 - 6x + k = 0$ has equal roots,
b the equation $x^2 + 2x + k = 0$ has real and distinct roots,
c the equation $x^2 - 3x + k = 0$ has no real roots,
d the equation $x^2 + kx + 4 = 0$ has real roots,
e the equation $kx^2 + x - 1 = 0$ has equal roots,
f the equation $x^2 + kx - 3k = 0$ has no real roots,
g the equation $x^2 + 2x + k - 2 = 0$ has real and distinct roots,
h the equation $2x^2 - kx + k = 0$ has equal roots,
i the equation $x^2 + kx + 2k - 3 = 0$ has no real roots,
j the equation $3x^2 + kx - x + 3 = 0$ has real roots.