

**C1 ALGEBRA****Worksheet J**

- 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.

# C1 ALGEBRA

## Worksheet K

1 Solve each of the following inequalities.

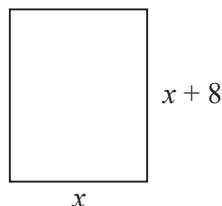
a  $\frac{1}{2}y + 3 > 2y - 1$

b  $x^2 - 8x + 12 \geq 0$

2 Find the set of integers,  $n$ , for which

$$2n^2 - 5n < 12.$$

3



The diagram shows a rectangular birthday card which is  $x$  cm wide and  $(x + 8)$  cm tall.

Given that the height of the card is to be at least 50% more than its width,

a show that  $x \leq 16$ .

Given also that the area of the front of the card is to be at least  $180 \text{ cm}^2$ ,

b find the set of possible values of  $x$ .

4 Find the set of values of  $x$  for which

$$(3x - 1)^2 < 5x - 1.$$

5 Given that  $x - y = 8$ ,

and that  $xy \leq 240$ ,

find the maximum value of  $(x + y)$ .

6 Solve the inequality

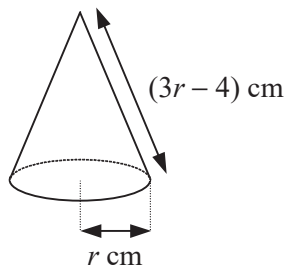
$$(3t + 1)(t - 4) \geq 2t(t - 7).$$

7 Given that the equation  $2x(x + 1) = kx - 8$  has real and distinct roots,

a show that  $k^2 - 4k - 60 > 0$ ,

b find the set of possible values of  $k$ .

8



A party hat is designed in the shape of a right circular cone of base radius  $r$  cm and slant height  $(3r - 4)$  cm.

Given that the height of the cone must not be more than 24 cm, find the maximum value of  $r$ .