Question 1 (4 Marks)

(a) Work out the value of $\left(\dfrac{16}{81}\right)^{\frac{3}{4}}$

....

(2)

$3^a = \dfrac{1}{9}$ $3^b = 9\sqrt{3}$ $3^c = \dfrac{1}{\sqrt{3}}$

(b) Work out the value of $a + b + c$

....
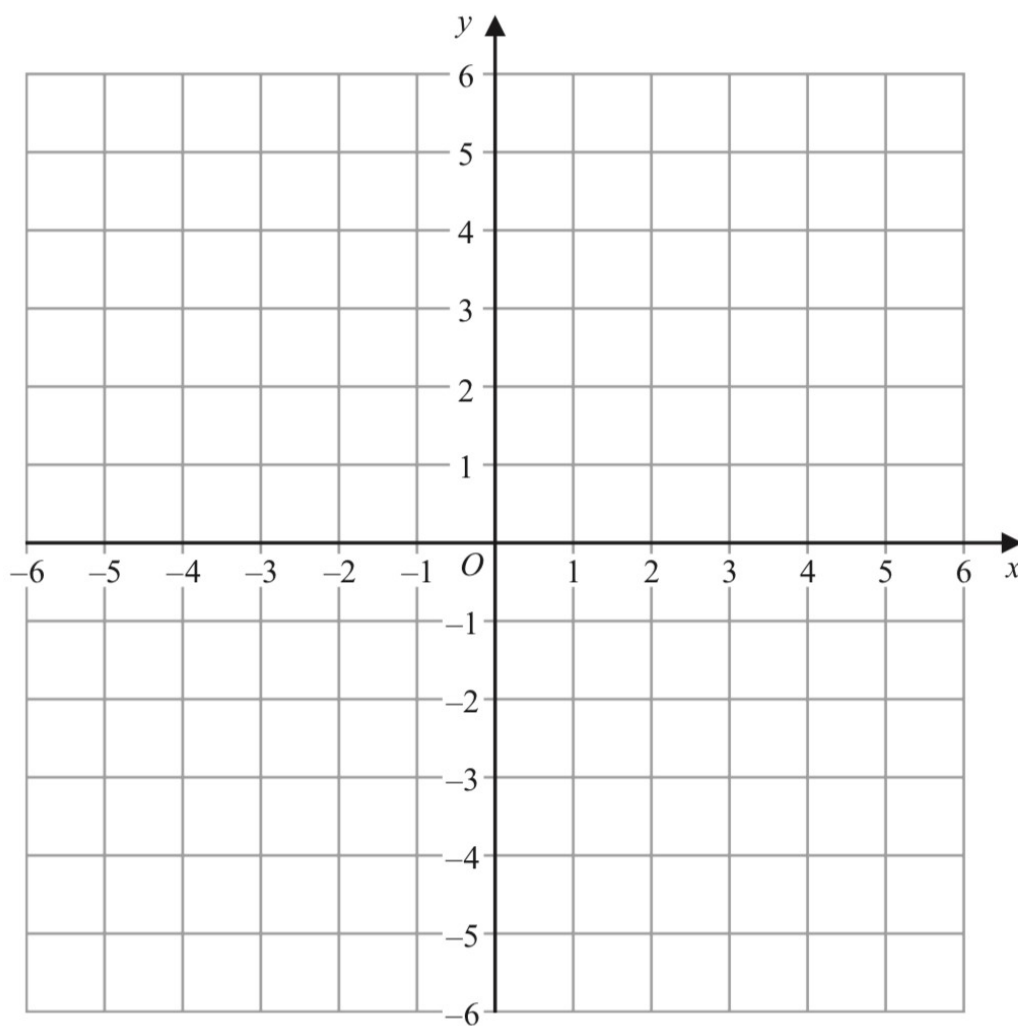
(2)

Question 2 (3 Marks)

On the grid show, by shading, the region that satisfies all of these inequalities.
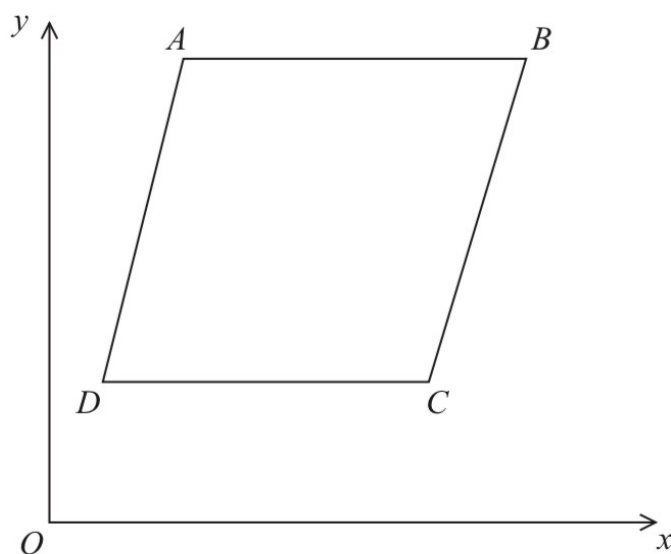
$$2y + 4 < x \qquad x < 3 \qquad y < 6 - 3x$$

Label the region **R**.

Question 3 (4 Marks)

ABCD is a rhombus.
The coordinates of *A* are $(5, 11)$
The equation of the diagonal *DB* is $y = \frac{1}{2}x + 6$

Find an equation of the diagonal *AC*.

Question 4 (4 Marks)

(a) Prove that

$$(2m + 1)^2 - (2n - 1)^2 = 4(m + n)(m - n + 1)$$

(3)

Sophia says that the result in part (a) shows that the difference of the squares of any two odd numbers must be a multiple of 4

(b) Is Sophia correct?
     You must give reasons for your answer.

....

....

....

(1)

(Total 15 Marks)