10. (a) On the axes in Diagram 1, sketch the graph of

$$y = |ax - 4|$$

where a is a positive constant.

Show on your sketch the coordinates of the points where the graph cuts or meets the axes.

(2)

(b) (i) On the same set of axes, sketch the graph of $y = -\frac{1}{x}$

(ii) Hence deduce the number of solutions to the equation

$$|ax - 4| = -\frac{1}{x}$$

giving a reason for your answer.

(2)

(c) (i) Find, using algebra, the exact value of x for which

$$|3x - 4| = -\frac{1}{x}$$

giving your answer in simplest form.

(ii) Hence deduce the range of values of x for which

$$|3x - 4| \geqslant -\frac{1}{x}$$

giving your answer in set notation.

(5)

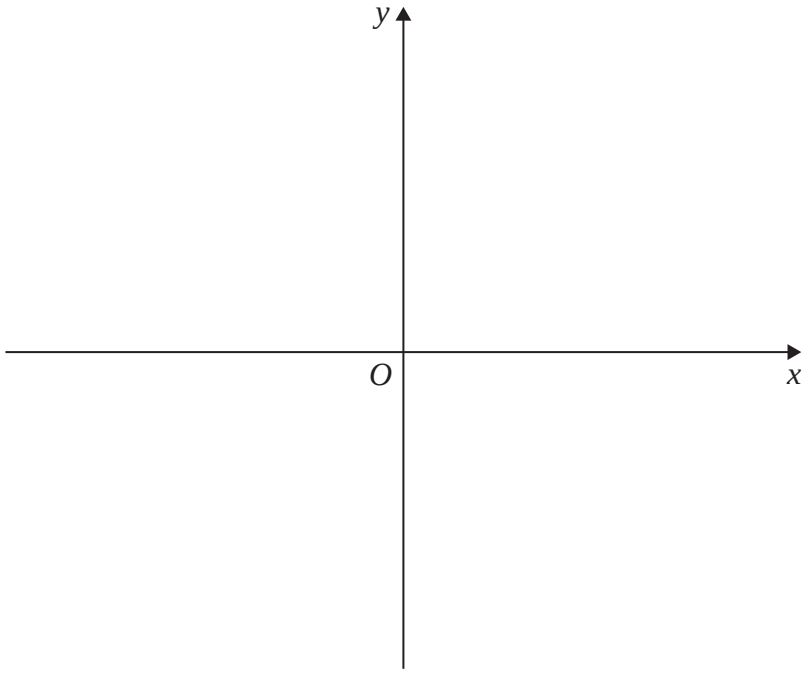

Diagram 1