3 A curve C has equation $y = \dfrac{ax - 3}{x + 5}$ where a is a constant and $x \neq -5$

The gradient of C at the point on the curve where $x = 2$ is $\dfrac{18}{49}$

(a) Show that $a = 3$

(3)

Hence

(b) write down an equation of the asymptote to C that is

(i) parallel to the x-axis,

(ii) parallel to the y-axis,

(2)

(c) find the coordinates of the point where C crosses

(i) the x-axis,

(ii) the y-axis.

(2)

(d) Sketch the curve C, showing clearly its asymptotes and the coordinates of the points where C crosses the coordinate axes.

(3)

Question 3 continued

Question 3 continued

Question 3 continued

(Total for Question 3 is 10 marks)