The function *f* is defined by  $f(x) = \frac{6x+1}{2x-1}, x \in \mathbb{R}, x \neq \frac{1}{2}$ 

- a) Write by f(x) in the form  $A + \frac{B}{2x-1}$  where A and B are constants
- b) Sketch the graph of y = f(x) stating the equations of any asymptotes and the coordinates of any intercepts with the axes

a) 
$$\frac{6x+1}{2x-1} \equiv A + \frac{B}{2x-1}$$

y = A is the equation of the horizontal asymptote

 $f(x) = \frac{6x+1}{2x-1}$  has a horizontal asymptote at y = 3 $\frac{6x+1}{2x-1} \equiv 3 + \frac{B}{2x-1}$  $\frac{6x+1}{2x-1} \equiv \frac{3(2x-1)+B}{2x-1}$  $6x + 1 \equiv 3(2x - 1) + B$  $6x + 1 \equiv 6x - 3 + B$ 

$$\frac{6x+1}{2x-1} \equiv 3 + \frac{4}{2x-1}$$

b) The function has

a horizontal asymptote at y = 3

a vertical asymptote at  $x = \frac{1}{2}$ 

The y intercept occurs when x = 0

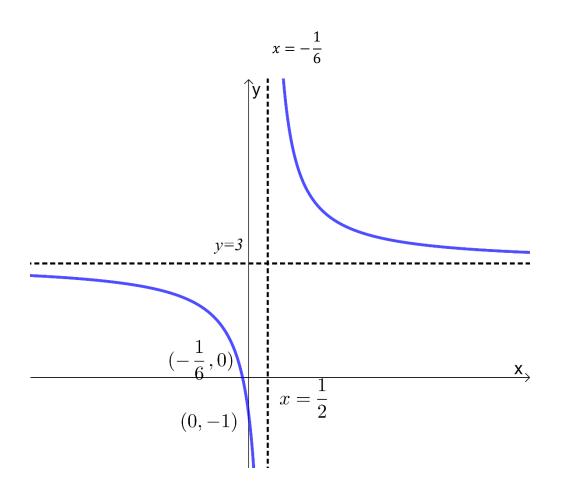
$$y = \frac{0+1}{0-1}$$
$$y = -1$$

B = 4

The x intercept occurs when y = 0

$$\frac{6x+1}{2x-1} = 0$$
$$6x+1 = 0$$







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