2.4

Q14 $f(x) = \dfrac{ax+b}{(x-1)(x-4)} = \dfrac{ax+b}{x^2-5x+4}$

$$f'(x) = \frac{a(x^2-5x+4) - (ax+b)(2x-5)}{(x^2-5x+4)^2}$$

$f'(2)=0 \longrightarrow \dfrac{a(-2)-(2a+b)(-1)}{(-2)^2} = 0$

$$-2a+2a+b=0$$

$$b=0$$

$f(2)=-1 \longrightarrow \dfrac{2a}{-2} = -1$

$$2a=2$$

$$a=1$$

So $f(x) = \dfrac{x}{(x-1)(x-4)}$.

Q13b

IF $r(t) = 2$

$\therefore \quad \frac{1+2t}{1+t} = 2$

$1 + 2t = 2 + 2t$

$1 = 2$

$\longrightarrow \longleftarrow$

Thus,

$r(t) \neq 2$

Note:

$$\lim_{t \to \infty} r(t) = \lim_{t \to \infty} \frac{1+2t}{1+t}$$

$$= \lim_{t \to \infty} \frac{\frac{1}{t} + 2}{\frac{1}{t} + 1}$$

$$= \frac{0+2}{0+1}$$

$$= 2$$

So, as $t \to \infty$

$r(t) \to 2$

i.e. there is a horizontal asymptote at $r(t) = 2$.