

Quiz 1

Name: key

1. Give a definition of the derivative  $f'(a)$ .

[5]

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

2. Use the definition of derivative to find  $f'(a)$  when  $f(x) = \frac{1}{3x+2}$ .

[15]

$$f'(a) = \lim_{h \rightarrow 0} \frac{\frac{1}{3(a+h)+2} - \frac{1}{3a+2}}{h} \quad (3)$$

$$= \lim_{h \rightarrow 0} \left\{ \frac{(3a+2) - [3(a+h)+2]}{[3(a+h)+2](3a+2)} \right\} \quad (3)$$

$$= \lim_{h \rightarrow 0} \frac{-3h}{h [3(a+h)+2](3a+2)} \quad (3)$$

$$= \lim_{h \rightarrow 0} \frac{-3}{[3(a+h)+2](3a+2)} \quad (3)$$

$$= \frac{-3}{(3a+2)(3a+2)} = \frac{-3}{(3a+2)^2}$$

(3)