

B

Limits

6 **9**

$$1. \quad a) \quad \lim_{x \rightarrow 2} \frac{(x-2)(2x+5)}{x-2}$$

$$= \lim_{x \rightarrow 2} 2x+5$$

$$= 9$$

$$b) \quad \lim_{x \rightarrow \infty} \frac{\frac{5x^2}{x^2} + \frac{x}{x^2} - \frac{3}{x^2}}{\frac{2x^2}{x^2} - \frac{4}{x^2}}$$

$$= \frac{5 + 0 - 0}{2 - 4}$$

$$= \frac{5}{-2}$$

$$c) \quad \lim_{x \rightarrow -3} \frac{\text{Constant}}{0}$$

D.N.E

Test Points	
x	y
-2.9	-145
-3.1	155

$$d) \quad \frac{7}{3}$$

$$e) \quad \lim_{x \rightarrow 7} \frac{7-x}{7x}$$

$$\lim_{x \rightarrow 7} \frac{-1(7-x)}{7x(7-x)}$$

$$\lim_{x \rightarrow 7} \frac{-1}{7x}$$

$$= \frac{-1}{49}$$

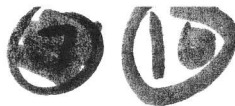
$$f) \quad \lim_{x \rightarrow \infty} \frac{(\sqrt{x+2} - \sqrt{2})(\sqrt{x+2} + \sqrt{2})}{x(\sqrt{x+2} + \sqrt{2})}$$

$$\lim_{x \rightarrow \infty} \frac{x+2-2}{x(\sqrt{x+2} + \sqrt{2})}$$

$$\lim_{x \rightarrow \infty} \frac{x}{x(\sqrt{x+2} + \sqrt{2})}$$

$$\lim_{x \rightarrow \infty} \frac{1}{\sqrt{x+2} + \sqrt{2}}$$

$$= \frac{1}{2\sqrt{2}}$$

B.

$$1. \quad g) \lim_{x \rightarrow 5} \frac{(5-x)(5+x)}{x-5}$$

$$\lim_{x \rightarrow 5} \frac{-1(\cancel{5-x})(5+x)}{\cancel{5-x}}$$

$$\lim_{x \rightarrow 5} -1(5+x)$$

$$= -10$$

$$h) \lim_{x \rightarrow 0} \frac{(2-(x+2))(4+2(x+2))}{x}$$

$$= \lim_{x \rightarrow 0} \frac{(-x)(4+2x+4+(x+2)^2)}{x}$$

$$= \lim_{x \rightarrow 0} -1(4+2x+4+(x+2)^2)$$

$$= -1(4+4+(2)^2)$$

$$= -12$$

C

Derivatives

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

$$= \lim_{h \rightarrow 0} \frac{(\sqrt{x+h+3} - \sqrt{x+3})(\sqrt{x+h+3} + \sqrt{x+3})}{h(\sqrt{x+h+3} + \sqrt{x+3})}$$

$$= \lim_{h \rightarrow 0} \frac{(x+h+3) - (x+3)}{h(\sqrt{x+h+3} + \sqrt{x+3})}$$

$$= \lim_{h \rightarrow 0} \frac{h}{h(\sqrt{x+h+3} + \sqrt{x+3})}$$

$$= \lim_{h \rightarrow 0} \frac{1}{\sqrt{x+h+3} + \sqrt{x+3}}$$

$$= \frac{1}{2\sqrt{x+3}}$$

M_t at x=1

$$M_t = \frac{1}{4}$$

Equation of tangent

$$\frac{1}{4} = \frac{y-2}{x-1}$$

$$4y-8 = x-1$$

Equation of normal

$$\frac{-4}{1} = \frac{y-2}{x-1}$$

$$-4x+4 = y-2$$