

Part one

Limit Def to compute $f'(x)$ @
given value

$$f(x) = x^2 + 4x \quad f'(x) @ x = -5$$

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

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

$$\lim_{h \rightarrow 0} \frac{[\cancel{x^2} + 2xh + h^2 + \cancel{4x} + 4h] - [\cancel{x^2} + \cancel{4x}]}{h}$$

$$\lim_{h \rightarrow 0} \frac{2xh + \cancel{h^2} + \cancel{4h}}{h}$$

$$\lim_{h \rightarrow 0} \frac{2x + h + 4}{2x + (0) + 4}$$
$$f'(x) = 2x + 4$$

$$f'(-5) = -6$$

3cm