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$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

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

$$f(x) = 3x + 5$$

$$f(x) = 3x + 5$$

$$f(x+h) = 3(x+h) + 5$$

$$\frac{3(x+h) + 5 - 3x - 5}{h} = \frac{3x + 3h + 5 - 3x - 5}{h}$$

$$\frac{3h}{h} = 3$$

$$f(x) = 2x - 4$$

$$f(x) = 2x - 4$$

$$f(x+h) = 2(x+h) - 4$$

$$\frac{2(x+h) - 4 - 2x + 4}{h} = \frac{2x + 2h - 4 - 2x + 4}{h}$$

$$\frac{2h}{h} = 2$$

$$f(x) = 5x^2 + 3x + 5$$

$$f(x+h) = 5(x+h)^2 + 3(x+h) + 5$$

$$5(x^2 + 2xh + h^2) + 3x + 3h + 5$$

$$5x^2 + 10xh + 5h^2 + 3x + 3h + 5$$

$$5x^2 + 10xh + 5h^2 + 3x + 3h + 5 - 5x^2 - 3x - 5$$

$$\frac{10xh + 5h^2 + 3h}{h} = h(10x + 5h + 3)$$

$$= 10x + 5h + 3 = 10x + 5(0) + 3 = \underline{10x + 3}$$

$$f(x) = 2x^2 + 5x + 10$$

$$f(x+h) = 2(x+h)^2 + 5(x+h) + 10$$

$$2(x^2 + 2xh + h^2) + 5x + 5h + 10$$

$$2x^2 + 4xh + 2h^2 + 5x + 5h + 10$$

$$\frac{2x^2 + 4xh + 2h^2 + 5x + 5h + 10 - 2x^2 - 5x - 10}{h}$$

$$= \frac{4xh + 2h^2 + 5h}{h} = h(4x + 2h + 5)$$

$$= 4x + 2h + 5 = 4x + 2(0) + 5 = \underline{4x + 5}$$

$$f(x) = 2x^3 + 2x^2 + 3x + 2$$

$$f(x+h) = 2(x+h)^3 + 2(x+h)^2 + 3(x+h) + 2$$

$$f(x+h) = 2(x^3 + 3x^2h + 3xh^2 + h^3) + 2(x^2 + 2xh + h^2) + 3x + 3h + 2$$

$$f(x+h) = 2x^3 + 6x^2h + 6xh^2 + 2h^3 + 2x^2 + 4xh + 2h^2 + 3x + 3h + 2$$

$$2x^3 + 6x^2h + 6xh^2 + 2h^3 + 2x^2 + 4xh + 2h^2 + 3x + 3h + 2 - 2x^3 - 2x^2 - 3x - 2$$

$$\frac{6x^2h + 6xh^2 + 2h^3 + 4xh + 2h^2 + 3h}{h}$$

$$= h(6x^2 + 6xh + 2h^2 + 4x + 2h + 3) = 6x^2 + 6xh + 2h^2 + 4x + 2h + 3$$

$$= 6x^2 + 6x(0) + 2(0) + 4x + 2(0) + 3$$

$$= \underline{6x^2 + 4x + 3}$$

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

$$a+b = a^2 + 2ab + b^2$$

$$f(x) = 2x^2 - 3x + 5$$

$$f(x+h) = 2(x+h)^2 - 3(x+h) + 5$$

$$f(x+h) = 2(x^2 + 2xh + h^2) - 3x - 3h + 5$$

$$\lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 - 3x - 3h + 5 - 2x^2 + 3x - 5}{h}$$

$$= \frac{h(4x + 2h - 3)}{h} = 4x + 2h - 3$$

$$\lim_{h \rightarrow 0} = 4x - 3$$

$$f(x) = 4x^2$$

$$f(x+h) = 4(x+h)^2$$

$$\lim_{h \rightarrow 0} \frac{4x+4h - 4x}{h} =$$

$$\frac{4h}{h} = 4$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$f(x) = 4x^2 + x + 3$$

$$f(x+h) = 4(x+h)^2 + (x+h) + 3$$

$$f(x+h) = 4x^2 + 8xh + 4h^2 + x + h + 3$$

$$\lim_{h \rightarrow 0} \frac{4x^2 + 8xh + 4h^2 + x + h + 3 - 4x^2 - x - 3}{h}$$

$$= \frac{8xh + 4h^2 + h}{h} = \frac{h(8x + 4h + 1)}{h}$$

$$\lim_{h \rightarrow 0} 8x + 4h + 1 = 8x + 1$$

$$\lim_{h \rightarrow 0} \frac{8x + 4h + 1}{8x + 4h + 1} = 8x + 1$$