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Pg 168 # 42

$$f(x) = 1/x \quad f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{\frac{1}{(x+h)} - \frac{1}{x}}{h}$$

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

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

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

$$\lim_{h \rightarrow 0} \frac{-1}{x(x+h)} \rightarrow \frac{-1}{x(x+0)} \rightarrow \boxed{f'(x) = -\frac{1}{x^2}}$$

$$\lim_{h \rightarrow 0} \frac{\frac{-1}{(x+h)^2} - \frac{-1}{x^2}}{h}$$

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

$$\lim_{h \rightarrow 0} \frac{2xh + h^2}{h(x^2 + 2x^2h + h^2x^2)}$$

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