

Joseph Ganger

Pg 166

27. Use def of a deriv for $f(x) = x + \sqrt{x}$

$$\frac{f(a+h) - f(a)}{h}$$

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

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

$$\lim_{h \rightarrow 0} \frac{h}{h} + \frac{\sqrt{a+h} - \sqrt{a}}{h} \times \frac{\sqrt{a+h} + \sqrt{a}}{\sqrt{a+h} + \sqrt{a}}$$

$$\lim_{h \rightarrow 0} 1 + \frac{a+h - a}{h(\sqrt{a+h} + \sqrt{a})}$$

$$\lim_{h \rightarrow 0} 1 + \frac{h}{h(\sqrt{a+h} + \sqrt{a})}$$

$$\lim_{h \rightarrow 0} 1 + \frac{1}{\sqrt{a+h} + \sqrt{a}}$$

$$1 + \frac{1}{\sqrt{a+0} + \sqrt{a}}$$

$$1 + \frac{1}{\sqrt{a} + \sqrt{a}}$$

$$1 + \frac{1}{2\sqrt{a}}$$

$$\text{Domain } f = [0, \infty)$$

$$\text{Domain } f' = (0, \infty)$$