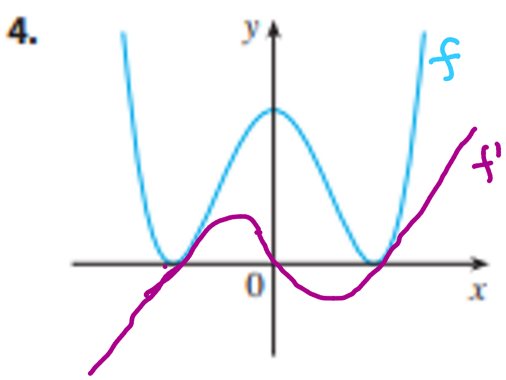
3 (a) $\to$ II

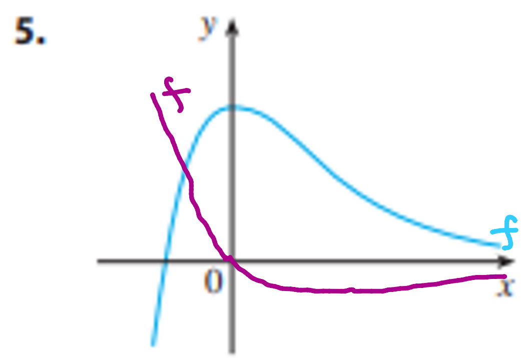
(b) $\to$ IV

(c) $\to$ I

(d) $\to$ III

4 and 5





21 $f(x) = 3x-8$

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

$$= \lim_{h\to 0} \frac{3(x+h) - 8 - (3x-8)}{h}$$

$$= \lim_{h\to 0} \frac{3x + 3h - 8 - 3x + 8}{h}$$

$$= \lim_{h\to 0} \frac{3h}{h}$$

$$= \lim_{h \to 0} 3 = 3.$$

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

(27) $g(x) = \sqrt{9-x}$

$D(f) = \{x \in \mathbb{R} : 9 - x \geq 0\}$

$= \{x \in \mathbb{R} : 9 \geq x\}$

$= (-\infty, 9]$

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

$$= \lim_{h \to 0} \frac{\sqrt{9-(x+h)} - \sqrt{9-x}}{h}$$

$$= \lim_{h \to 0} \frac{\sqrt{9-x-h} - \sqrt{9-x}}{h}$$

$$= \lim_{h \to 0} \frac{(\sqrt{9-x-h} - \sqrt{9-x})(\sqrt{9-x-h} + \sqrt{9-x})}{h(\sqrt{9-x-h} + \sqrt{9-x})}$$

$$= \lim_{h \to 0} \frac{(\sqrt{9-x-h})^2 - (\sqrt{9-x})^2}{h(\sqrt{9-x-h} + \sqrt{9-x})}$$

$$= \lim_{h \to 0} \frac{9-x-h-(9-x)}{h\left(\sqrt{9-x-h}+\sqrt{9-x}\right)}$$

$$= \lim_{h \to 0} \frac{9-x-h-9+x}{h\left(\sqrt{9-x-h}+\sqrt{9-x}\right)}$$

$$= \lim_{h \to 0} \frac{-h}{h\left(\sqrt{9-x-h}+\sqrt{9-x}\right)}$$

$$= \lim_{h \to 0} \frac{-1}{\sqrt{9-x-h}+\sqrt{9-x}}$$

$$= \frac{-1}{\sqrt{9-x-0}+\sqrt{9-x}}$$

$$= \frac{-1}{2\sqrt{9-x}}$$

$$D(f') = \{x \in \mathbb{R} : 9-x>0\}$$

$$= \{x \in \mathbb{R} : 9>x\}$$

$$= (-\infty, 9).$$

(29) $G(t) = \dfrac{1-2t}{3+t}$

$$D(G) = \{t \in \mathbb{R} : 3 + t \neq 0\}$$
$$= \{t \in \mathbb{R} : t \neq -3\}$$
$$= (-\infty, -3) \cup (-3, \infty)$$

$$f'(t) = \lim_{h \to 0} \frac{G(t+h) - G(t)}{h}$$

$$= \lim_{h \to 0} \frac{\dfrac{1-2(t+h)}{3+(t+h)} - \dfrac{1-2t}{3+t}}{h}$$

$$= \lim_{h \to 0} \frac{\dfrac{1-2t-2h}{3+t+h} - \dfrac{1-2t}{3+t}}{h}$$

$$= \lim_{h \to 0} \frac{(3+t)(1-2t-2h) - (1-2t)(3+t+h)}{(3+t)(3+t+h)} \div \frac{h}{1}$$

$$= \lim_{h \to 0} \frac{3-6t-6h+t-2t^2-2th - (3+t+h-6t-2t^2-2th)}{h(3+t)(3+t+h)}$$

$$= \lim_{h \to 0} \frac{3-5t-6h-2t^2-2th - (3-5t+h-2t^2-2th)}{h(3+t)(3+t+h)}$$

$3+5t-h+2t^2+2th$

$$= \lim_{h\to 0} \frac{3-5t-6h-2t^2-2th-3+5t-h+2t^2+2th}{h(3+t)(3+t+h)}$$

$$= \lim_{h\to 0} \frac{-6h-h}{h(3+t)(3+t+h)}$$

$$= \lim_{h\to 0} \frac{h(-7)}{h(3+t)(3+t+h)}$$

$$= \lim_{h\to 0} \frac{-7}{(3+t)(3+t+h)}$$

$$= \frac{-7}{(3+t)(3+t+0)} = \frac{-7}{(3+t)^2}$$

$$D(G') = \{x \in \mathbb{R} : (3+t)^2 \neq 0\}$$

$$= \{x \in \mathbb{R} : (3+t) \neq 0\}$$

$$= \{x \in \mathbb{R} : t \neq -3\}$$

$$= (-\infty, -3) \cup (-3, \infty)$$

$$= D(G)$$