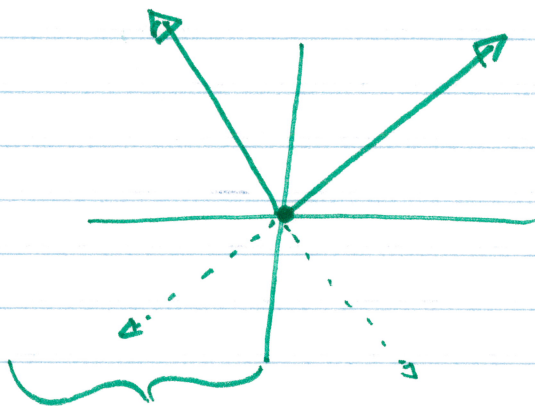


2.4

$$(13) f(x) = |x|$$

$$f(x) = \begin{cases} -x, & x \leq 0 \\ x, & x > 0 \end{cases}$$



$$(a) \lim_{h \rightarrow 0} \frac{(2+h) - (2)}{h} = \lim_{h \rightarrow 0} \frac{h}{h} = \lim_{h \rightarrow 0} 1 = 1$$

$$(b) \lim_{h \rightarrow 0} \frac{-(-3+h) - 3}{h} = \lim_{h \rightarrow 0} \frac{3-h-3}{h} = \lim_{h \rightarrow 0} \frac{-h}{h} = \lim_{h \rightarrow 0} -1 = -1$$

$$\lim_{x \rightarrow 2} \frac{(x/2)(x+1)}{x/2} = \lim_{x \rightarrow 2} x+1 = 3$$

$$(19) y = x^2 + 2$$

$$\lim_{h \rightarrow 0} \frac{[(a+h)^2 + 2] - [a^2 + 2]}{h} = \lim_{h \rightarrow 0} \frac{a^2 + 2ah + h^2 + 2 - a^2 - 2}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(2a+h)}{h} = \lim_{h \rightarrow 0} 2a+h = 2a$$

2.4

(21)

$$y = \frac{1}{x-1}$$

$$\lim_{h \rightarrow 0} \frac{\frac{1}{(a+h)-1} - \frac{1}{a-1}}{h} \cdot \frac{[(a+h)-1][a-1]}{[(a+h)-1][a-1]}$$

$$\lim_{h \rightarrow 0} \frac{(a-1) - [(a+h)-1]}{h [(a+h)-1][a-1]} = \lim_{h \rightarrow 0} \frac{a-1 - a-h+1}{h [(a+h)-1][a-1]}$$

$$\lim_{h \rightarrow 0} \frac{-h}{h [(a+h)-1][a-1]} = \lim_{h \rightarrow 0} \frac{-1}{[(a+h)-1][a-1]} = \frac{-1}{[a-1][a-1]} = \frac{-1}{(a-1)^2}$$

(11) $y = \frac{1}{x-1}$ $x=2$

$$\lim_{h \rightarrow 0} \frac{\left[\frac{1}{(2+h)-1} - \frac{1}{2-1} \right]}{h} = \lim_{h \rightarrow 0} \frac{\left[\frac{1}{(2+h)-1} - \frac{1}{1} \right]}{h}$$

$$\lim_{h \rightarrow 0} \frac{\frac{1}{(2+h)-1} - \frac{(2+h)-1}{(2+h)-1}}{h} = \lim_{h \rightarrow 0} \frac{1 - 2 - h + 1}{h [(2+h)-1]}$$

$$\lim_{h \rightarrow 0} \frac{-h}{h [(2+h)-1]} = \lim_{h \rightarrow 0} \frac{-h}{(2+h)-1} \cdot \frac{1}{h} = \lim_{h \rightarrow 0} \frac{-1}{(2+h)-1} = -1$$

2.4
③① $y = \frac{1}{x-1}$

$$y' = \frac{-1}{(x-1)^2} = -1$$

$$a = 0, 2$$

$$\begin{pmatrix} 0, -1 \\ 2, 1 \end{pmatrix}$$

$$y - (-1) = -1(x - 0)$$

$$y + 1 = -x$$

$$y - 1 = -1(x - 2)$$

$$y - 1 = -(x - 2)$$

③② $y' = \frac{-1}{(x-1)^2} = -1$