

13. $f(x) = x^2 + x$, $a = 1$

$f(x+h) - f(x)$

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

$2x^{2-1}$

$f'(x) = 2x + 1$

$f'(1) = 2(1) + 1$

$\boxed{-3}$

b) $f(x) = 1^2 + 1$

$f(x) = 2$

$\frac{d}{dx}(x^2 + x)$

$\frac{d}{dx}(x^2) + \frac{d}{dx}(x)$

$= 2x + 1 = 2(1) + 1 = 3$

$\boxed{f(x) = 3x - 1, y = 3x - 1}$

16. $f(x) = \sqrt{x+8}$, $a = 1$

a) $\frac{d}{dx}(\sqrt{x+8})$

$\frac{d}{du}(\sqrt{u}) \frac{d}{dx}(x+8)$

$\frac{d}{du}(\sqrt{u})$

$\frac{d}{du}(u^{1/2})$

$= \frac{1}{2} u^{-1/2} = \frac{1}{2\sqrt{u}}$

$\boxed{\frac{1}{2\sqrt{x+8}}}$

b) $\frac{1}{2\sqrt{x+8}}$

refined to

$\frac{1}{6}$

$y = \frac{1}{6}x + b$

$3 = \frac{1}{6} \cdot 1 + b$

$3 = \frac{1}{6} \cdot 1 + b$

$b = 17/6$

$y = \frac{1}{6}x + 17/6$

$\boxed{f(x) = \frac{1}{6}x + 17/6}$

24. $f(x) = 3x^2 - x + 2$, $a = 1$

a) $y = 3 \cdot 1^2 - 1 + 2$

$y = 4$

$\frac{d}{dx}(3x^2)$

$= 3 \frac{d}{dx}(x^2)$

$= 3 \cdot 2x^{2-1}$

$6x$

$6x - 1 + 0$

$6x - 1$

b) $6 \cdot 1 - 1$

5

$y = 5x + b$

$4 = 5 \cdot 1 + b$

$5 \cdot 1 + b = 4$

$5 + b = 4$

$-5 \quad -5$

~~$6x - 1$~~

$b = -1$

$\boxed{y = 5x - 1, f(x) = 5x - 1}$

$$(58) f(x) = 5x - x^2$$

$$\lim_{h \rightarrow 0} \left[\frac{f(x+h) - f(x)}{h} \right]$$

$$\lim_{h \rightarrow 0} \left[\frac{5(x+h) - (x+h)^2 - (5x - x^2)}{h} \right]$$

$$= 2hx - h^2 + 5h$$

h

$$(61) f(x) = 9/x$$

$$\lim_{h \rightarrow 0} \left[\frac{f(x+h) - f(x)}{h} \right]$$

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

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

$$\boxed{\frac{-9}{x^2}}$$

(64)

