$f(x)$	$f'(x)$
c	0
x^1	$1 \leftarrow 1x^0$
x^2	$2x$
x^3	$3x^2$
x^4	$4x^3$
x^n	nx^{n-1}

Power rule

$c = cx^0$

$(cx^0)' = c \cdot 0x^{-1}$

$$f(x) = 2x^3 \longrightarrow f' = 2(3x^2)$$

$$\frac{df}{dx} = \lim_{h \to 0} \frac{2(x+h)^3 - 2x^3}{h} = 6x^2$$

$$= \lim_{h \to 0} 2\left(\frac{(x+h)^3 - x^3}{h}\right)$$

1) $f(x) = 2x^4 - 3x$

Find f'. $f' = 2(4x^3) - 3$

$= 8x^3 - 3$

2) $f(x) = (2x-3)^2$

Find f'.

$f(x) = 4x^2 - 12x + 9$

② ✓

$f' = 8x - 12$

~~①~~

$f' = 2(2x-3)$

$= 4x - 6$

3) $f(x) = \sqrt{x} - \frac{2}{x^3}$

$f' = ?$ $= x^{\frac{1}{2}} - 2x^{-3}$

$f' = \frac{1}{2}x^{-\frac{1}{2}} + 6x^{-4}$

$= \frac{1}{2\sqrt{x}} + \frac{6}{x^4}$

4) $f(x) = \dfrac{2 - 3x^2 + x^3}{x}$

Find $f'(x)$.

$= \dfrac{2}{x} - \dfrac{3x^2}{x} + \dfrac{x^3}{x}$

$= 2x^{-1} - 3x + x^2$

$f'(x) = -2x^{-2} - 3 + 2x$