

문제 7.1.2)

다음에 $(f^{-1})'(d)$ 의 값을 구하시오

(1)

$$f(x) = \sqrt{3x+1}, d=1$$

sol)

$$\sqrt{3x+1} = 1 \quad f'(x) = \frac{1}{2} \cdot \frac{1}{\sqrt{3x+1}} \cdot 3$$

$$3x+1 = 1 \quad = \frac{3}{2\sqrt{3x+1}}$$

$$x=0$$

$$(f^{-1})'(y) = \frac{2\sqrt{3x+1}}{3}$$

$$(f^{-1})'(1) = \frac{4}{3}$$

$$\text{답} = \frac{4}{3}$$

(2)

$$f(x) = x^2 - \frac{2}{x} - 3 \quad x > 0, d=2$$

sol)

$$x^2 - \frac{2}{x} - 3 = 2$$

$$x^2 - \frac{2}{x} - 5 = 0$$

$$x(x^2 - 2x - 5) = 0$$

$$x^3 - 5x - 2 = 0 \Rightarrow (x+2)(x^2 - 2x - 1) = 0$$

$$\begin{array}{r|rrrrr} -2 & 1 & 0 & -5 & -2 & \\ & & -2 & 4 & 2 & \\ \hline & 1 & -2 & -1 & 0 & \end{array}$$

$$(x+2)(x^2 - 2x - 1) = 0$$

$$x = -2$$

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

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

$$\begin{aligned} (f^{-1})'(2) &= \frac{1}{-4 + \frac{2}{4}} = \frac{1}{\frac{-14}{4}} \\ &= -\frac{4}{14} \\ &= -\frac{2}{7} \end{aligned}$$

$$\text{답} = -\frac{2}{7}$$