2.3

③ $h(t) = \sqrt[3]{t}\,(t^2+4) = t^{1/3}(t^2+4)$ — $2t^{4/3}$

$h'(t) = \frac{1}{3}t^{-2/3}(t^2+4) + t^{1/3}(2t^{3/3}+0)$

$h'(t) = \frac{1}{3}t^{-2/3}\left[(t^2+4) + 6t^2\right]$

$$h'(t) = \frac{7t^2+4}{3t^{2/3}}$$

⑨ $h(x) = \frac{\sqrt[3]{x}}{x^3+1}$ — $3x^{7/3}$

$h'(x) = \frac{\frac{1}{3}x^{-2/3}(x^3+1) - x^{1/3}(3x^2+0)}{(x^3+1)^2}$

$h'(x) = \frac{\frac{1}{3}x^{-2/3}\left[(x^3+1) - 9x^3\right]}{(x^3+1)^2}$

$$h'(x) = \frac{1-8x^3}{3x^{2/3}(x^3+1)^2}$$

⑪ $g(x) = \frac{\sin x}{x^2}$

$g'(x) = \frac{(\cos x)(x^2) - \sin x\,(2x)}{x^4}$

$$g'(x) = \frac{1 \cdot (x\cos x - 2\sin x)}{x^4 \; x^3}$$

$$\boxed{g'(x) = \frac{x\cos x - 2\sin x}{x^3}}$$

(29) $f(x) = \dfrac{2x+5}{\sqrt{x}} = \dfrac{2x}{x^{1/2}} + \dfrac{5}{x^{1/2}} = 2x^{1/2} + 5x^{-1/2}$

$$f'(x) = 2\left(\tfrac{1}{2}x^{-1/2}\right) + 5\left[-\tfrac{1}{2}x^{-3/2}\right]$$

$$f'(x) = \tfrac{1}{2}x^{-3/2}\left[2x^1 - 5\right]$$

$$\boxed{f'(x) = \frac{2x-5}{2x^{3/2}}}$$

2.2 #64

$f(x) = k - x^2$; $y = -4x + 7$

(2, -1)

Slope:

$f'(x) = 0 - 2x$

$= -2x$

$m = -4$

Equate slopes

$-2x = -4 \Rightarrow x = 2$

Find intersection point using $x = 2$

$y = -4(2) + 7$

$y = -1$

Back Sub. $x=2$, $y=-1$ to find k

y ↑ $f(x)$

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

$-1 = k - (2)^2$ → $3 = k$

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