(1) [6] Use the definition of the derivative to determine y' if $y = \frac{6}{x}$.

$$y' = \lim_{h\to 0} \frac{1}{h}\left[\frac{6}{x+h} - \frac{6}{x}\right]$$

$$= \lim_{h\to 0} \frac{1}{h} \frac{6x - 6x - 6h}{(x+h)x}$$

$$= \lim_{h\to 0} \frac{-6\cancel{h}}{\cancel{h}(x+h)x}$$

$$= \boxed{\frac{-6}{x^2}}$$

(2) [3] Differentiate $f(x) = -9x^{1/3} + 5x^{-2/5}$

$$f'(x) = -9\left(\tfrac{1}{3}\right)x^{-2/3} + 5\left(-\tfrac{2}{5}\right)x^{-\frac{7}{5}}$$

$$= \boxed{-3x^{-2/3} - 2x^{-7/5}}$$

(3) [3] Differentiate $h(z) = \dfrac{6-2z}{z^2-4}$

$$h'(z) = \frac{(z^2-4)(-2) - (6-2z)(2z)}{(z^2-4)^2}$$

$$= \frac{-2z^2+8-12z+4z^2}{(z^2-4)^2}$$

$$= \frac{2z^2-12z+8}{(z^2-4)^2}$$

(4) [3] Differentiate $y = 4x^2\sqrt{5x+1}$ $= 4x^2[5x+1]^{1/2}$

$$y' = 8x[5x+1]^{1/2} + 4x^2\left(\tfrac{1}{2}\right)[5x+1]^{-\frac{1}{2}}(5)$$

$$= 8x\sqrt{5x+1} + \frac{10x^2}{\sqrt{5x+1}}$$

$$= \frac{8x(5x+1)+10x^2}{\sqrt{5x+1}}$$

$$= \frac{50x^2+8x}{\sqrt{5x+1}}.$$