Nr. 1) a.) $f(x) = 4x^2 + 2x + 1 \Rightarrow f'(x) = 8x + 2 \Rightarrow f''(x) = 8$

b) $f(x) = \frac{1}{6}x^3 - \frac{3}{4}x^2 - 4 \Rightarrow f'(x) = \frac{1}{2}x^2 - \frac{3}{2}x \Rightarrow f''(x) = x - \frac{3}{2}$

c) $f(x) = 2\cos(x) \Rightarrow f'(x) = -2\sin(x) \Rightarrow f''(x) = -2\cos(x)$

d) $f(x) = 2\sqrt{x} - 2x = 2x^{\frac{1}{2}} - 2x$

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

e) $f(x) = \sqrt[3]{x} + 4 = x^{\frac{1}{3}} + 4 \Rightarrow f'(x) = \frac{1}{3} \cdot x^{-\frac{2}{3}} = \frac{1}{3 \cdot \sqrt[3]{x^2}}$

$\Rightarrow f''(x) = \frac{1}{3} \cdot \left(-\frac{2}{3}\right) \cdot x^{-\frac{5}{3}} = \frac{-2}{9 \cdot \sqrt[3]{x^5}}$

f) $f(x) = -x^{-2} + 3x \Rightarrow f'(x) = 2 \cdot x^{-3} + 3 = \frac{2}{x^3} + 3$

$\Rightarrow f''(x) = -6 \cdot x^{-4} = \frac{-6}{x^4}$

g) $f(x) = \frac{5}{x^3} - \frac{x^3}{5} = 5 \cdot x^{-3} - \frac{1}{5}x^3 \Rightarrow f'(x) = -15 \cdot x^{-4} - \frac{3}{5}x^2$

$f'(x) = \frac{-15}{x^4} - \frac{3}{5}x^2 \Rightarrow f''(x) = 60x^{-5} - \frac{6}{5}x = \frac{60}{x^5} - \frac{6}{5}x$

h) $f(x) = 5 \Rightarrow f'(x) = 0 \Rightarrow f''(x) = 0$

i) $f(x) = 5^3 \Rightarrow f'(x) = 0 \Rightarrow f''(x) = 0$

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