

$$1. a) h(t) = 3t^7 - 6t^4 + 8t^3 - 12t + 18$$

$$h'(t) = 21t^6 - 24t^3 - 24t^2 - 12$$

$$h''(t) = 126t^5 - 72t^2 - 48t$$

$$h'''(t) = 630t^4 - 144t - 48$$

$$h^{(4)}(t) = 2520t^3 - 144$$

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

$$f'(x) = 2x^{-3} + 9x^2$$

$$f''(x) = -6x^{-4} + 18x$$

$$f'''(x) = 24x^{-5} + 18$$

$$f^{(4)}(x) = -120x^{-6}$$

$$f^{(4)}(x) = \frac{-120}{x^6}$$

$$c) f(x) = 4\sqrt[5]{x^3} - \frac{1}{8x^2} - \sqrt{x}$$

$$f(x) = 4x^{\frac{3}{5}} - \frac{x^{-2}}{8} - x^{\frac{1}{2}}$$

$$f'(x) = \frac{12}{5}x^{-\frac{2}{5}} + \frac{x^{-3}}{4} - \frac{1}{2}x^{-\frac{1}{2}}$$

$$f''(x) = -\frac{24}{25}x^{-\frac{7}{5}} - \frac{3}{4}x^{-4} + \frac{1}{4}x^{-\frac{3}{2}}$$

$$f'''(x) = \frac{168}{125}x^{-\frac{12}{5}} + 3x^{-5} - \frac{3}{8}x^{-\frac{5}{2}}$$

$$f^{(4)}(x) = -\frac{2016}{625}x^{-\frac{17}{5}} - 15x^{-6} + \frac{15}{16}x^{-\frac{7}{2}}$$

$$f^{(4)}(x) = -\frac{2016}{625\sqrt[5]{x^{17}}} - \frac{15}{x^6} + \frac{15}{16\sqrt{x^7}}$$