1. Find the deriviative of each of the following functions. Simplify your answers completely.

(a) $f(x) = 2x^5 - 4x^3 + \frac{2}{3}x^3 + 15x^2 - 3x + 10$

(b) $f(x) = 4x^5 - \pi x^3 + \pi^3 x - \sqrt{2}$

(c) $f(x) = 2\pi$

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

(e) $f(x) = (x^4 + x^3 + x^2 + x + 1)(x - 1)$

(f) $f(x) = x^3 \sin x$

(g) $f(x) = (x^3 + \sqrt{x} - 1)(\cos x)$

(h) $f(x) = \dfrac{5x^4 - 3x^2 + 7}{x^2}$

(i) $f(x) = \dfrac{x^2 - 4}{3x + 6}$

(j) $f(x) = \dfrac{5x^3 - 2x + 1}{3\cos x}$

(k) $f(x) = \dfrac{5\sin x}{(2x+1)^2}$

(l) $f(x) = \cos^2 x$

(m) $f(x) = \cos^3 x$

(n) $f(x) = \tan x$

(o) $f(x) = \tan x \csc x$

(p) $f(x) = \sin(2x)$

2. Find the following higher order derivatives. You do not need to simplify your answers.

(a) Find $f''(x)$ if $f(x) = x^{\frac{7}{5}} + \dfrac{4}{x}$

(b) Find $f''(x)$ if $f(x) = \sqrt{x}\cos x$

(c) Find $f^{(17)}(x)$ if $f(x) = \sin x$