(12 pts) Differentiate the functions

a) \( g(w) = (w^2 - 3w + 4)(w + 4)^5 \)

b) \( h(v) = \left[ v - \left( 1 - \frac{1}{v} \right)^{-1} \right]^{-2} \)

c) \( p(t) = \left( \frac{1}{t} + \frac{1}{t^2} + \frac{1}{t^3} \right)^{-4} \)
(18 pts) Find the indicated derivatives

a) \( \frac{d}{dt} \left[ t \frac{d}{dt} (\cos(t^2)) \right] \)

b) \( \frac{d}{dx} \left[ x^{-2} - \sec(3x + 1) \right]^4 \)

c) \( \frac{d}{dx} \left[ \frac{\cos x}{1 + \tan(2x)} \right] \)
(10 pts) Find equations for the tangent and normal lines at the indicated point

\[ x^2 + xy + 2y^2 = 28; \quad (-2, -3) \]
(10 pts) Find the absolute maximum and minimum values of

\[ f(x) = 2x^3 - 3x^2 - 12x + 15 \]

on the closed interval \([0, 3]\).
(10 pts) A farmer has 200 yd of fence with which to construct three sides of a rectangular pen; an existing long, straight wall will form the fourth side. What dimensions will maximize the area of the pen?
(10 pts) Find the intervals on which the function

\[ f(x) = (x - 1)^2(x + 2)^2 \]

is increasing and those on which it is decreasing. Sketch the graph of \( f(x) \) and label the local maxima and minima. Global extrema should be so identified.
(10 pts) Describe the concavity of the graph of $f$ and find the points of inflection (if any):

$$f(x) = 4x^{1/3} + x^{4/3}$$