1. **(36 points)** Compute the following derivatives by any legal method.

   (a) \( f'(x) \), where \( f(x) = \tan(5x^2 - 8) \).

   (b) \( \frac{d}{dt}(1 - t^4\sqrt{\cos t}) \).

   (c) \( y' \), where \( xy + y^3 = 4x^2 \).

   (d) \( g'(x) \), where \( g(x) = \frac{x^2 + 3x}{x + 1} \).

   (e) \( h''(x) \), where \( h(x) = \frac{x^3 + 4}{\sqrt{x}} \).

2. **(14 points)** Suppose \( f, g, h \) are functions such that

   \[ f(2) = 4, \quad f'(2) = -3, \quad g(1) = 2, \quad g'(1) = 5, \quad h(1) = 7, \quad h'(1) = -2. \]

   Let \( F(x) = f(g(x)) \) and \( G(x) = g(x) \cdot h(x) \). Compute \( F'(1) \) and \( G'(1) \).

3. **(20 points)** A state trooper is parked on a North-South road 60 meters from where it intersects an East-West road. Meanwhile, a truck is driving along the East-West road. At the moment the truck is 80 meters past the intersection, the trooper (using his radar gun) sees that the truck’s distance from him is increasing at 12 m/sec. How fast is the truck actually going at that time?

4. **(18 points)** Let \( g(x) = \frac{x + 4}{x^2 + 9} \).

   Find the absolute minimum and absolute maximum values of \( g \) on the interval \([-4, 4]\).

5. **(12 points)** Let \( f(x) = \sin^3(4x) + \sec(4x) - 8\sin(2x) \). Compute \( f'(\frac{\pi}{12}) \). Simplify.