1. (1.5 pts each) Find the derivative of each function. (You do not need to simplify.)

(a) \( f(x) = \frac{4}{x^2} - \frac{3}{2\sqrt{x}} + 5\sqrt[3]{x^3} - \frac{7}{3x^2} \)

(b) \( g(x) = \frac{4x^3 + 2x}{7x^4 - 3x^2 + 1} \)

(c) \( h(x) = \frac{7}{\sqrt[3]{3x^2} - 7x + 2} \)

(d) \( f(x) = (7x - 3x^2) \cos x \)

(e) \( g(x) = \frac{\sec x \sin x}{1 + \tan x} \)
(f) \( h(x) = (4x^2 - 3x + 9)^2 (5x - 3)^4 \)

3. A particle moves according to the distance function

\[ s(t) = 2t^3 - 17t^2 + 40t + 19 \]

(a) (1 pt) Find the velocity at time \( t \).

(b) (1 pt) Find the acceleration at time \( t \).

(c) (2 pts) When is the particle moving in a positive direction?

2. (2 pts) Find the equation of the line tangent to the graph of \( f(x) = \frac{6}{1-x^2} \) at the point \( (2,-2) \).

(d) (1 pt) (SET UP ONLY) Find the total distance travelled in the first 14 seconds.