(1) When the tangent line exists at an inflection point, does it definitely cross the graph of the function? Why?

(2) Find the slope of the tangent at (2, 2) of a curve \( y^2 = \frac{20 - x^2}{2x} \).

(3) Let \( f(x) = \sqrt{|1 - x|} \). Discuss whether \( f \) is continuous or differentiable at \( x = 1 \)?

(4) The concentration \( C \) (in milligrams per milliliter) of a drug in a patient’s bloodstream \( t \) hours after injection into muscle tissue is modeled by

\[
C' = \frac{3t}{27 + t^3}.
\]

(i) Find the change in the concentration when \( t \) changes from \( t = 1.5 \) to \( t = 2 \).

(ii) Use differentials to approximate the change.

(5) The demand equation is given by \( p = \sqrt[3]{9 - x^3} \) where \( p \) is the unit price at which \( x \) units of the product are demanded. Define the price elasticity of demand as \( \eta = \frac{p}{x} \frac{dp}{dx} \).

(i) Is the demand elastic (\( |\eta| > 1 \)), inelastic (\( |\eta| < 1 \)), or of unit elastic (\( |\eta| = 1 \)) at \( x = 2 \)? Give an economic interpretation for your answer.

(ii) Find the expression for the total revenue and compute the values of \( x^* \) and \( p^* \) that maximize the total revenue.

(iii) Show that the demand at \( x^* \) is of unit elastic. Moreover, on the interval \( (0, x^*) \) the demand is elastic and the total revenue is increasing.

(6) Let

\[
f(x) = \frac{3}{x^2 + 2}.
\]

(i) Find all critical numbers, relative extrema and points of inflection.

(ii) Determine (with reasons) whether \( f \) has vertical or horizontal asymptotes.

(iii) Sketch the graph of \( f \).