You must show correct work to receive full credit for a correct answer. Display your work neatly!

1. (10 points) Using the definition of derivative (i.e., 4-step process), find the derivative of \( f(x) = x^2 + 3x + 7 \).

2. (10 points) Using the definition of derivative (i.e., 4-step process), find the derivative of \( f(x) = -\frac{1}{x} \).
3. (10 points) Simplify the expression to the lowest terms.
\[
\frac{(b - a) \left( a^2 + 2ab + b^2 \right)}{(2a^2 - 2b^2) \left( 4a + 4b \right)}
\]

4. (10 points) Two ships leave port at the same time. Ship A sails north at a speed of 30 mph while ship B sails east at a speed of 40 mph. Find an expression in terms of the time \( t \) (in hours) giving the distance between the two ships.

5. (10 points) Find the domain of the function.
\[
f(x) = \frac{x + 3}{x^2 - 16}
\]

6. (10 points) Find the composite function \( f \circ g \). Simplify your answer.
\[
f(x) = \frac{x}{x^2 + 1}
\]
\[
g(x) = \frac{1}{x}
\]
7. (10 points) Find the limit.
\[ \lim_{x \to -2} \frac{x^2 - x - 6}{x^2 + x - 2} \]

8. (10 points) Find the limit.
\[ \lim_{x \to \infty} \frac{3x^4 - 4x^3 - 2}{x^4 - 2x} \]

9. (10 points) Find the derivative of \( f(t) \).
\[ f(t) = \frac{4}{x^4} - 4x^3 + \frac{2}{\sqrt{x}} \]

10. (10 points) Let \( f(x) = x^3 - 4x^2 \). Find the points on the graph of \( f \) where the tangent line is horizontal.