

Mathematical Analysis (470-2110/06)

Exercises – Part 5

The problems given below are to practise for the semester tests or the final exam.

Derivative of Function

Find the first derivative $f'(x)$ of a function $f(x)$, if

1. $f(x) = x \arcsin \frac{1}{x};$

2. $f(x) = (\sin x)^{(x^2)};$

3. $f(x) = \sin^2 (\cos^3 x);$

4. $f(x) = \ln(\arctan x);$

5. $f(x) = \frac{x+5}{4-x} - \sqrt{x^2+1};$

6. $f(x) = \sqrt[3]{x^3+x^2-6};$

7. $f(x) = \ln(x + \sqrt{x^2-1});$

8. $f(x) = \ln(x^x);$

9. $f(x) = 5 + \operatorname{arccot} \left(\frac{2-x}{1+2x} \right) - \arctan x.$

Write an equation of a tangent line of a function $f(x)$ at the point x_0 , if

$$f(x) = \sqrt{16-x^2} \quad \text{and} \quad x_0 = [3, ?].$$