

## Fysiikan matematiikka: Harjoitus 3

$$1. f_{xx} = \frac{x^2 - y^2}{(x^2 + y^2)^2}, f_{xy} = \frac{2xy}{(x^2 + y^2)^2},$$
$$f_{yy} = \frac{y^2 - x^2}{(x^2 + y^2)^2}$$

$$2. a) y' = \frac{2xy}{y-1} \quad b) y' = \frac{x}{y}$$

$$3. a) \frac{4}{\pi} \quad b) 6 \quad c) \frac{1}{2} \sin^2(x) + C$$

$$4. a) \frac{1}{2} \ln \frac{3}{2} \quad b) \frac{1}{2} \ln \frac{3}{5}$$

$$5. a) -x \cos x + \sin x$$

$$b) \frac{x^3}{3} \ln x - \frac{x^3}{9}$$

$$c) xe^x - e^x$$

$$d) -\frac{\ln x + 1}{x}$$