5. Find the limit if it exists, $\lim_{(x,y)\to(0,0)} \frac{x^2y}{x^4+y^2}$

6. Is the function $f(x,y)$ continuous at (0,0), if $f(x,y) =$

$$\begin{cases} 0. & for \quad (x,y) = (0,0) \\ \sqrt{x^2+y^2}\ln\left(\sqrt{x^2+y^2}\right). & for \quad (x,y) \neq (0,0) \end{cases}$$

Prove your answer.

7. Given $f(x,y) = \cos(x^2 + xy)$, find the limit $\lim_{h\to 0} \frac{f\left(\frac{\sqrt{\pi}}{2},h\right) - f\left(\frac{\sqrt{\pi}}{2},0\right)}{h}$.

8. Let $f(x,y) = \ln(x^2 + y^2)$

(a) Find differential df and

(b) Find the linearly approximation to f(x,y) at the point (1,1).

(c) Use (b), to approximate f(1.01, 0.98) (Hint: $\ln 2 = 0.693$)

9. Find $\frac{dy}{dx}$ if $x^3 - 4xy + 2y^2 = 3$.	10. Find $\frac{\partial w}{\partial r}$ and $\frac{\partial w}{\partial s}$ if $w = e^{(x^2 y + x y^2)}$ and $x = sr$ and $y = 2s+3r$ if $r = 1$, $s = -1$.