

Feng Chia University 110-2 Purdue Calculus II TEST II

(Time : 90 minutes. Pages: Three Pages, Total 100 points)

Name : _____ SID : _____

A 、 Computations : (Total 100%, 10 points each, Show all your work, NO DETAIL WORK, NO POINTS!!)

1. Find the Maclaurin polynomial $P_3(x)$ of the function $f(x) = \cos \sqrt{x}$

2. Find the power series representation of the function $f(x) = \frac{x-1}{2+x}$ centered at $x=1$

3. Find the power series representation of $f(x) = \tan^{-1} \frac{x}{2}$ centered at 0

4. (a) Find the power series representation of $f(x) = \frac{x}{1+x^2}$ centered at 0.
(b) Find the series representation of $\ln 2$ by (a).

<p>5. Find the limit if it exists, $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 y}{x^4 + y^2}$</p>	<p>6. Is the function $f(x,y)$ continuous at $(0,0)$, if $f(x,y) =$</p> $\begin{cases} 0. & \text{for } (x,y) = (0,0) \\ \sqrt{x^2 + y^2} \ln(\sqrt{x^2 + y^2}). & \text{for } (x,y) \neq (0,0) \end{cases}$ <p>Prove your answer.</p>
<p>7. Given $f(x,y) = \cos(x^2 + xy)$, find the</p> $\lim_{h \rightarrow 0} \frac{f\left(\frac{\sqrt{\pi}}{2}, h\right) - f\left(\frac{\sqrt{\pi}}{2}, 0\right)}{h}.$	<p>8. Let $f(x,y) = \ln(x^2 + y^2)$</p> <p>(a) Find differential df and</p> <p>(b) Find the linearly approximation to $f(x,y)$ at the point $(1,1)$.</p> <p>(c) Use (b), to approximate $f(1.01, 0.98)$ (Hint: $\ln 2 = 0.693$)</p>

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 $w = e^{(x^2y+xy^2)}$
and $x = sr$ and $y = 2s+3r$ if $r = 1$,
 $s = -1$.