Exam

Name:

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THIS

(1) Find a power series representation, and its interval of conve
$\left(\textbf{Hint}: x^2 - 2x = (x-1)^2 - 1.\right)$

$$\frac{1}{x^2-2x} = \frac{1}{-1+(x-1)^2} = \frac{-1}{1-(x-1)}$$

The series converges only if
and the interval of con

(2) Find the exact value of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1} n^2}{2^{n/2}}$. $\left(\textbf{Hint}: \frac{}{(1}\right.$

$$\frac{d}{dx} \frac{x}{(1-x)^2} = \frac{1+x}{(1-x)^3} =$$

$$\frac{1-x}{(1+x)^3} = \sum_{n=1}^{\infty}$$

$$x \frac{1-x}{(1+x)^3} = \sum_{n}$$

$$\sqrt{2}(\sqrt{2}-1)^4 = \frac{1}{\sqrt{2}} \frac{1-1/\sqrt{2}}{(1+1/\sqrt{2})^3} =$$

(3) An

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(4) Find

(Hi

(5) Fin

(6) Com

$\left\langle \frac{1-}{1+} \right.$

B

a

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(7) Pr
pa

(8) Fin

(9) Compute the limit

We have

so that

$$\lim_{(x,y)\to(}$$

(10) Show that all tange

At a poin

the gradie

and the

$$\left(-e^{y_0/x_0}\right.$$

Since

$$-x_0\,($$

$$= \quad -x_0$$

$$= \quad 0 ,$$

any sur

(11)

(12)

(13) Find

at

at

(14) Find

(15) Find the (absolute) minimum of the function $f(x,y)$ =

Over the disc, we have

$$0 \leq x^2+y^2$$

$$e^0 \leq e^{x^2+y^2}$$

$$e^{-2} = \frac{1}{e^2} \leq e^{-x^2-y^2}$$

the min value
attained at any
point of the
circle with equation x^2+y

(16) Compute the integral $\iint_R (x-y)^2\, dA$ over the rectang

By Fubini, this is

$$\int_{-1}^{1} \left(\int_{-2}^{2} (x-y)^2\, dy \right.$$

$$\int_{-1}^{1} -\frac{(x-y)^3}{3} \Big]$$

$$\int_{-1}^{1} \left(-\frac{(x-2)^3}{3} + \right.$$

$$-\frac{(x-2)^4}{12} +$$

$$-\frac{1}{12} + \frac{3^4}{12} + \frac{3^4}{12}$$

(17) Compute the integ

(18) Compute the volum

(19) Use a double in
the circle $x^2 + y$

the circles

the "maxim

By using
the reg

$\iint_{D}$

(20) Compute the tri
radius 1. (**Hint**
which $dV = \rho^2 \sin$

The integ

$=\ 2$

$=\ 2$

$=$

$=$