2018 Fall **Calculus-2 Final Test**	Dept. or School		proctor	
	Student ID		Name	

** 5 Pts for Each Question

1. Evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$, when $\mathbf{F}(x,y,z) = < z^2, x^2, y^2 >$ and C is the line segment from $(0,0,0)$ to $(1,1,1)$.

2. Find the local maximum and minimum values and saddle points of $f(x,y) = x^4 + y^4 - 4xy$.

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3. Evaluate

$$\int_0^1 \int_{\arcsin y}^{\frac{\pi}{2}} \cos x \sqrt{1+\cos^2 x}\, dx\, dy.$$

4. Evaluate

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \int_0^{\csc\theta} (r^7 \sin\theta \cos^3\theta + re^{\cot\theta})\, dr\, d\theta.$$

다음장으로

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5. Let

$$\mathbf{F}(x,y) = < \frac{y^2}{\sqrt{1-x^2y^2}}, \frac{xy}{\sqrt{1-x^2y^2}} + \sin^{-1}xy > .$$

Is the vector field $\mathbf{F}$ conservative? If so, find f such that $\nabla f = \mathbf{F}$.

6. Evaluate

$$\oint_C y^2\,dx + 3xy\,dy,$$

where C is the boundary of the semiannular region in the upper-half plane between two circles $x^2+y^2=4$ and $x^2+y^2=9$.

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7. Find the area of the part of the cone $z^2 = 4(x^2+y^2)$ between $z=1$ and $z=4$.

8. Find the area of the part of the surface

$$z = \arctan\left(\frac{y}{x}\right)$$

that lies above the region D:

$$D = \{(x,y) \mid 1 \le x^2+y^2 \le 8\} \cap \{(x,y) \mid 0 \le y \le x\} .$$

(Hint. You may use the derivative of $x\sqrt{x^2+1}$)

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