

## Quiz 7

Signature: \_\_\_\_\_

Let  $f(x, y, z) = \frac{x^4 e^y}{z}$  and  $P_0(1, 0, 1)$ .

1. Compute  $\nabla f(P_0)$ .

2. Find the maximum rate of change of  $f$  at  $P_0$ .

3. Find the angle  $\theta$  between  $\nabla f(P_0)$  and  $\mathbf{u}$  if  $\mathbf{u}$  is a unit vector such that  $D_{\mathbf{u}}f(P_0) = 3$ .

4. Give an explicit example of a unit vector  $\mathbf{u}$  with  $D_{\mathbf{u}}f(P_0) = 3$ . No explanation is required.

$$\mathbf{u} = \boxed{\phantom{000}} \mathbf{i} + \boxed{\phantom{000}} \mathbf{j} + \boxed{\phantom{000}} \mathbf{k}$$