1.
   - $f(x,y) = x^3y^4 + x^4y^3$
   - $P = (1,1)$
   - $\theta = \frac{\pi}{6}$

   $\theta = \frac{\pi}{6} \equiv$

   $x = \cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

   $y = \sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$

   $\Rightarrow \theta = (\frac{\sqrt{3}}{2}, \frac{1}{2})$

   $u = \frac{\theta}{\|\theta\|} = (\frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{10}}{2}}, \frac{\frac{1}{2}}{\frac{\sqrt{10}}{2}}) =$

   $(\frac{\sqrt{3}}{\sqrt{10}}, \frac{1}{\sqrt{10}})$

   $f_x = 3x^2y^4 + 4x^3y^3$

   $f_y = 4x^3y^3 + 3x^4y^2$

   $f_x \wedge f_y$ son continua en todo $\Re^2 \Rightarrow f$ es derivable $\Rightarrow$

   $D_u f(1,1) = \boldsymbol{\nabla} f(1,1) \cdot u$

   $D_u f(1,1) = (7,7) \cdot (\frac{\sqrt{3}}{\sqrt{10}}, \frac{1}{\sqrt{10}}) = \frac{7\sqrt{3}}{\sqrt{10}} + \frac{7}{\sqrt{10}}$

2.
   - $f(x,y) = ye^{-x}$
   - $P = (0,4)$
   - $\theta = \frac{2\pi}{3}$

   $f_x = -ye^{-x}$

   $f_y = e^{-x}$

   $f_x \wedge f_y$ son continuas $\Rightarrow$ f es diferenciable en todo $\Re^2 \Rightarrow$

   $D_u f(0,4) = \boldsymbol{\nabla}(0,4) \cdot u$

   $\theta = (\cos\left(\frac{2\pi}{3}\right).\sin\left(\frac{2\pi}{3}\right)) = (\frac{-1}{2}, \frac{\sqrt{3}}{2})$

   $u = \frac{\theta}{\|\theta\|} = (\frac{-1}{\sqrt{10}}, \frac{\sqrt{3}}{\sqrt{10}})$

   $D_u f(0,4) = (-4,1) \cdot (\frac{-1}{\sqrt{10}}, \frac{\sqrt{3}}{\sqrt{10}}) = (\frac{4}{\sqrt{10}}, \frac{\sqrt{3}}{\sqrt{10}})$