1. $r : \Re \to \Re^3$

   $C : r(t) = (r_1(t), r_2(t), r_3(t)) = (x, y, z)$

   $r_1 : \Re \to \Re$

   $r_2 : \Re \to \Re$

   $r_3 : \Re \to \Re$

   $\begin{cases} x^2 + z^2 = 4 \\ y = 3z^2 \end{cases}$

   - $x^2 + z^2 = 4$ es un circulo con centro en $(x, z) = (0, 0)$ con radio $= \sqrt{4} = 2$

     $\Rightarrow enpolareses 2\cos(t) + 2\sin(t) = 1$

     $\Rightarrow \begin{cases} x = 2\cos(t) \\ z = 2\sin(t) \end{cases} : \star$

   - $y = 3z^2 \overset{\star}{\Rightarrow} y = 3(2\sin(t))^2$

   $\Rightarrow r(t) = \begin{cases} r_1(t) = 2\cos(t) \\ r_2(t) = 3(2\sin(t))^2 \\ r_3(t) = 2\sin(t) \end{cases} : \star$

   $\Rightarrow r(t) = (2\cos(t), 3(2\sin(t))^2, 2\sin(t))$

2. QvQ $\exists t_1, t_2 \in \Re; r(t_1) = (2, 0, 0) \wedge r(t_2) = (0, 12, 2)$

   - $r(t_1) = (2, 0, 0) \Leftrightarrow \begin{cases} 2 = 2\cos(t_1) \\ 0 = 3(2\sin(t_1))^2 \\ 0 = 2\sin(t_1) \end{cases} \Leftrightarrow$

     $2 = 2\cos(t_1) \Leftrightarrow$

     $1 = \cos(t_1) \Leftrightarrow$

     $t_1 = \frac{\pi}{2}$

   - $r(t_2) = (0, 12, 2) \Leftrightarrow \begin{cases} 0 = 2\cos(t_2) \\ 12 = 3(2\sin(t_2))^2 \\ 2 = 2\sin(t_2) \end{cases} \Leftrightarrow$

     $0 = 2\cos(t_2) \Leftrightarrow$

     $0 = \cos(t_2) \Leftrightarrow$

     $t_2 = 0$

   - $t_1 = \frac{\pi}{2}$
   - $t_2 = 0$

3. - $\overrightarrow{v} = (-2, 0, 0)$
   - $\overrightarrow{u} = (0, -12, -2)$
   - $Area_p = |\overrightarrow{v} \times \overrightarrow{u}| = |\begin{vmatrix} i & j & k \\ -2 & 0 & 0 \\ 0 & -12 & -2 \end{vmatrix}| =$

     $|0i - 4j + 24k| = \sqrt{16 + 576} = 24{,}33$