

MAT-2454 - Lista 1

(I) Esboce o traço de cada uma das seguintes curvas em $\mathbb{R}^2$:

- (1) $\gamma(t) = (t, 1)$
- (2) $\gamma(t) = (3t, t)$
- (3) $\gamma(t) = (4t + 2, t - 1)$
- (4) $\gamma(t) = (t, 2t^3)$
- (5) $\gamma(t) = (t^2, t)$
- (6) $\gamma(t) = (\text{sent}, t), t > 0$
- (7) $\gamma(t) = (3\text{cost}, 3\text{sent})$
- (8) $\gamma(t) = (3\text{cost}, 4\text{sent})$
- (9) $\gamma(t) = (e^t \text{cost}, e^t \text{sent}), t \geq 0$
- (10) $\gamma(t) = (e^{-t} \text{cost}, e^{-t} \text{sent}), t \geq 0$

(II) Esboce os traços das seguintes curvas em $\mathbb{R}^3$:

- (1) $\gamma(t) = (t, t, 1), t \geq 0$
- (2) $\gamma(t) = (1, t, 1), t \geq 0$
- (3) $\gamma(t) = (2\text{cost}, 2\text{sent}, 5)$
- (4) $\gamma(t) = (\text{cost}, 3\text{sent}, 4)$
- (5) $\gamma(t) = (\text{cost}, \text{sent}, t), t \geq 0$
- (6) $\gamma(t) = (\text{sent}, \text{sent}, \sqrt{2}\text{cost})$

(III) Determine a reta tangente à curva $\gamma(t) = (\text{cost}, \text{sent}, t)$ no ponto $\gamma(\frac{\pi}{4})$.

(IV) Determine a reta tangente à curva dada por interseção das superfícies $x^2 + y^2 + z^2 = 10$ com o plano $z = 3x$ no ponto $(\frac{\sqrt{3}}{2}, \frac{\sqrt{10}}{2}, \frac{3\sqrt{3}}{2})$.