Examen I Parcial

1. $r(t) = \begin{cases} 7t+8 \\ 3t+7 \end{cases}$ $\quad \vec{v} = \begin{cases} x_0 ; & x \geq 0 \\ y_0 \end{cases}$

$r(t) \parallel \vec{v}$

Vector director: $(7,3) \parallel a\ r(t)$

$V_{unitario} = \frac{(7,3)}{\sqrt{7^2+3^2}} = \frac{(7,3)}{\sqrt{49+9}} = \frac{(7,3)}{\sqrt{58}} = \left(\frac{7}{\sqrt{58}}, \frac{3}{\sqrt{58}}\right)$

* Grafica y magnitud

2. P: $\underbrace{(26,\theta)}_{\text{Polares}}, 0<\theta<\frac{\pi}{2}$; $\underbrace{(6,y)}_{\text{Rectangulares}}$ $\qquad 100y+\theta$

Polares: $x = 26\cos\theta = 6 \Rightarrow \theta = \pm\arccos\left(\frac{6}{26}\right) + 2\pi k \Rightarrow \arccos\left(\frac{3}{13}\right)$

$y = 26\operatorname{sen}\theta = y$

$26\operatorname{sen}(\arccos(\frac{3}{13})) = y \Rightarrow y \approx 25.298$

$100y+\theta = 100(26\operatorname{sen}(\arccos(\frac{3}{13}))) + \arccos(\frac{3}{13}) \approx \underline{2531.160}$

* Graficos apuntos

3. vector unario $= \frac{\vec{v}}{|v|}$: $(0.5, b, 0.6)$, $b \geq 0$

$1 = \sqrt{0.5^2+b^2+0.6^2} = 0.5^2+b^2+0.6^2 = \frac{61}{100} + b^2$

$b^2 = 1 - \frac{61}{100} = \frac{39}{100} \Rightarrow b = \frac{\sqrt{39}}{10} \approx 0.624$

* Sacar norma

4. Longitud $\begin{cases} x(t) = 74\ln t \\ y(t) = 74\ln t \end{cases}$, $1 \leq t \leq 13$ $\quad x' = 74/t$ $\quad y' = 74/t$

$l = \int_1^{13} \sqrt{\frac{74^2}{t^2} + \frac{74^2}{t^2}}\, dt = \int_1^{13} \sqrt{2\left(\frac{74^2}{t^2}\right)} = \sqrt{2}\int_1^{13} \frac{74}{t}\, dt = 74\sqrt{2}\ln t$

$= 74\sqrt{2}\ln 13 - 74\sqrt{2}\ln 1 \approx 268.427$

* Voltiom

$a(x-x_0)+b(y-y_0)+c(z-z_0)=0$

5. Pendiente $r(\theta)=66$, cuando $\theta=2$

$r=66$, $r_0'=0$

$m=\frac{0\sin\theta+66\cos\theta}{0\cos\theta-66\sin\theta}=\frac{-66\cos\theta}{66\sin\theta}=-\cot\theta$

$\Rightarrow m(2)=-\cot(2)=0.458$

* Graficar

*6. Pendiente $C(t)=\begin{cases}x(t)=4t^2-5\\ y(t)=8t^3-6\end{cases}$ $m=\frac{y'}{x'}$ $t=5$

$y'=8t$, $x'=24t^2$

$m=\frac{8t}{24t^2}=\frac{1}{3t}\Rightarrow m(5)=\frac{1}{3(5)}=1/15=0.067$

8. Vector perpendicular al plano $5x+8y+5z=0$. es $(1,b,c)$

$b+10c$.

Otro perpendicular es $(5,8,5)$. Hacemos $(1,b,c)$ un múltiplo

$(5,8,5)=\lambda(1,b,c)$

$5=\lambda\rightarrow$ $\Rightarrow \frac{8}{5}+10(1)=\frac{58}{5}$

$8=b\lambda\rightarrow 8=5b\rightarrow b=\frac{8}{5}$

$5=c\lambda\rightarrow 5=5c\rightarrow c=1$

9. Si $x+y=a$, $xy=a\Rightarrow \frac{x}{y}+\frac{y}{x}=\frac{x^2+y^2}{yx}=\frac{a^2-2xy}{xy}$

~~$x=a-y$, $x=\frac{a}{y}\Rightarrow a-y=\frac{a}{y}\Rightarrow$~~

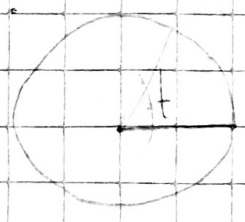
$\frac{x^2y^2-2xy}{xy}=xy-2$

Si $x+y=a\Rightarrow (x+y)^2=a^2$

$x^2+2xy+y^2=a^2-2xy$

* Wolfram

*10.



Si $f(t)=(a(t),b(t))$, a (74)

$a(t)=r\cos t+h=44\cos 74+85$

≈ 92.556

11. $|(a, 6\theta)|^2 = 480{,}000.\ a^2$

$\vec{v} \cdot \vec{v} = |v|^2 \Rightarrow a^2 + 6\theta^2 = 480{,}000$

$a^2 = 480{,}000 - 6\theta^2$

$a^2 = 475{,}376$

12. $r(\theta) = \cos(24\theta); \quad -\alpha \le \theta \le \alpha$

$r(\alpha) = 0$

$\Rightarrow \cos(24\theta) = 0$

$24\theta = \pm \arccos(0) + 2\pi k$

$\theta = \frac{\pm \arccos(0) + 2\pi k}{24}$: $\frac{\pi}{48}, \frac{5\pi}{48}, \frac{3\pi}{16} \ldots$

$\frac{\pi}{16}, \frac{7\pi}{48} \ldots$

$0 = \cos(24(\theta + 2\pi k)) \rightarrow 0 = \cos(24(\theta + 2\pi k + \pi))$

$= \cos(24\theta + 48\pi k) \qquad = \cos(24\theta + 48\pi k + 24\pi)$

$0 = \cos(24\theta) \rightarrow$ Miso $\qquad 0 = \cos(24\theta)$