S T Q Q S S D

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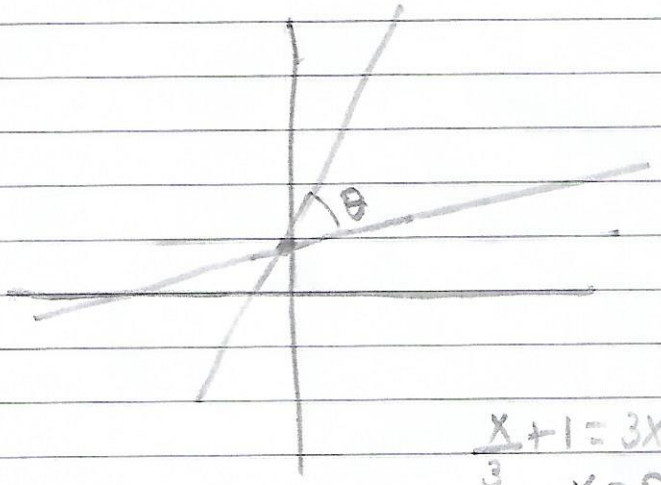
1)



$r_1: y = 3x + 1$

$r_2: m_{r_2} = \frac{2-3}{3-6} = \frac{1}{3}$

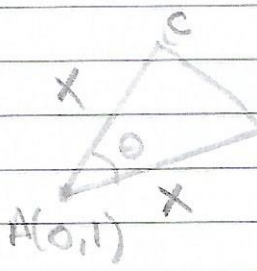
$y - 2 = \frac{1}{3}(x - 3)$

$\boxed{y = \frac{x}{3} + 1}$

$\frac{x}{3} + 1 = 3x + 1$

$x = 0$

$y = 1$



$\tan\theta = \frac{3 - \frac{1}{3}}{1 + 3 \cdot \frac{1}{3}} = \frac{8}{3} \cdot \frac{1}{2} = \frac{4}{3} \Rightarrow \theta = \tan^{-1}\left(\frac{4}{3}\right)$

$A = 4 = \frac{x^2 \sin\theta}{2}$

$\Leftrightarrow 8 = x^2 \sin\left(\tan^{-1}\left(\frac{4}{3}\right)\right)$

$x^2 = 10 \Rightarrow x = \sqrt{10}$

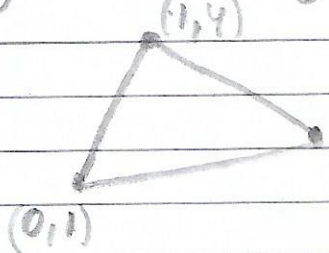
$B: d((0,1), (x, \frac{x}{3}+1)) = \sqrt{10} \Leftrightarrow \sqrt{x^2 + (1 - \frac{x}{3} - 1)^2} = \sqrt{10} \Leftrightarrow \frac{10x^2}{9} = 10$

$\Rightarrow x = 3, \; y = \frac{3}{3} + 1 = 2 \Leftrightarrow B: (3,2)$

$C: d((0,1), (x, 3x+1)) = \sqrt{10} \Leftrightarrow x^2 + (1 - 3x - 1)^2 = 10 \Leftrightarrow 10x^2 = 10$

$x^2 = 1$

$\Rightarrow x = 1, \; y = 3 \cdot 1 + 1 \Leftrightarrow y = 4 \Leftrightarrow C(1,4)$



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116
13
48
160
208

S T Q Q S S D

2)a) $C_1: 4x^2 - 8x + y^2 - 6y + 9 = 0$

$4(x^2 - 2x + 1 - 1) + (y-3)^2 = 0$

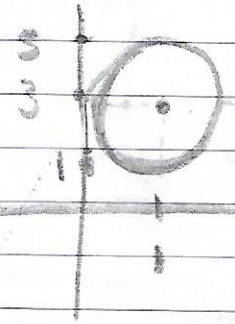
$4(x-1)^2 + (y-3)^2 = 4$

$\frac{(x-1)^2}{1} + \frac{(y-3)^2}{4} = 1$

$a = 2$
$b = 1$

$C(1,3)$

$c^2 = 2^2 + 1$
$c = \sqrt{5}$



$F_1(1, 3+\sqrt{5})$

$F_2(1, 3-\sqrt{5})$

$A_1(1, 3+2) = (1,5)$

$A_2(1, 3-2) = (1,1)$

$B_1(3, 1+1) = (3,2)$

$B_2(3, 1-1) = (3,0)$

eixo menor: $y = 3$
eixo maior: $x = 1$

$e = \frac{\sqrt{5}}{2}$

2)b) $C_2: 9x^2 - 90x - 16y^2 + 81 = 0$

$9(x^2 - 10x + 25 - 25) - 16y^2 = -81$

$9(x-5)^2 - 225 - 16y^2 = -81$

$\frac{9(x-5)^2}{144} - \frac{16y^2}{144} = 1$

$C(5,0)$

$a^2 = 144/9$, $a = 4$
$b^2 = 144/16$, $b = 3$
$c = 5$

$\frac{(x-5)^2}{16} - \frac{y^2}{9} = 1$

spiral

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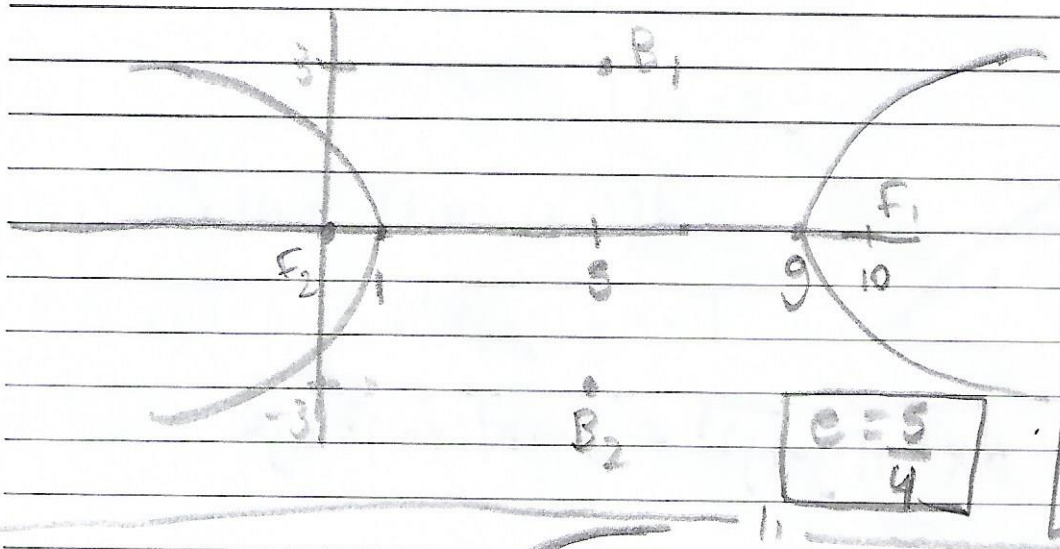
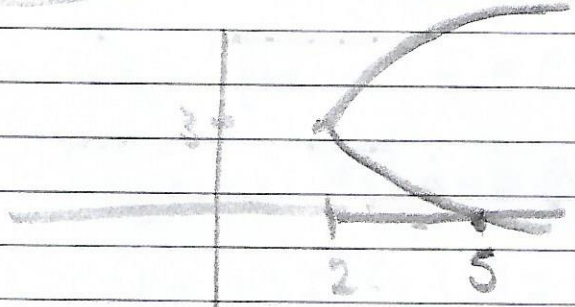


$A_1(0,9)$
$A_2(0,1)$
$F_1(0,10)$
$F_2(0,0)$
$B_1(5,3)$
$B_2(5,-3)$

$e = \frac{5}{4}$

1)

2)c)



eixo de simetria: $y = 3$
$V(3,2)$
passa pelo $P(5,0)$

$(y-3)^2 = 2p(x-2)$

$(0-3)^2 = 2p(5-2)$

$9 = 2p \cdot 3$

$p = 3/2$

$\boxed{(y-3)^2 = 3(x-2)}$

3)

$a^2 = b^2 + c^2$

$\frac{9}{4} = b^2 + \frac{1}{4}$

$b^2 = \frac{7}{4} \Rightarrow b = \frac{\sqrt{7}}{2}$

$2a = 3$

$a = 3/2$

$d((0,1),(1,0)) = 2c$

$\sqrt{(-1)^2 + 1^2} = 2c$

$2c = \sqrt{2}$

$c = \frac{\sqrt{2}}{2}$

spiral

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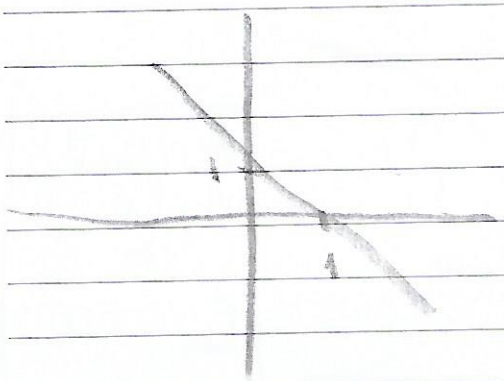

$y = -x + 1$

$d((x,y),(0,1)) + d((x,y),(1,0)) = 2a$

$\sqrt{x^2 + (y-1)^2} + \sqrt{(x-1)^2 + y^2} = 3$

$\sqrt{x^2 + (y-1)^2} = 3 - \sqrt{(x-1)^2 + y^2}$

$x^2 + y^2 - 2y + 1 = 9 - 6\sqrt{(x-1)^2 + y^2} + x^2 - 2x + 1 + y^2$

$2(x - y) - 9 = -6\sqrt{x^2 - 2x + 1 + y^2}$

$4(x-y)^2 - 36(x-y) + 81 = 36(x^2 - 2x + 1 + y^2)$

$4x^2 - 8xy + 4y^2 - 36x + 36y - 36x^2 + 72x - 36y^2 - 36 + 81 = 0$

$\boxed{-32x^2 - 32y^2 - 8xy + 36x + 36y + 45 = 0}$