1. Calcule a distância entre $P(5,-5)$ e $(r)\ 4x + 3y + 10 = 0$.

$d_{P,r} = \dfrac{|ax+by+c|}{\sqrt{a^2+b^2}}$

$P(x_0, y_0) \rightarrow P(5,-5)$

$r: ax+by+c=0$ → $4x+3y+10=0$

$d_{P,r} = \dfrac{4.(5)+3.(-5)+10}{\sqrt{4^2+3^2}}$

$d_{P,r} = \dfrac{20-15+10}{\sqrt{16+9}}$

$d_{P,r} = \dfrac{15}{\sqrt{25}} \rightarrow d_{P,r} = 3$

2. Calcule a distância entre $P(0, 10)$ e $(r)\ y = \frac{3}{4}x + \frac{1}{2}$.

($0 \rightarrow x_0$, $10 \rightarrow y_0$)

$r: y = \frac{3}{4}x + \frac{1}{2} \quad .4$

$4y = 3x + 2$

$3x - 4y + 2 = 0$

$d_{P,r} = \dfrac{|3.0 - 4.(10)+2|}{\sqrt{3^2+4^2}}$

$d_{P,r} = \dfrac{|-40+2|}{\sqrt{16+9}}$

$d_{P,r} = \dfrac{38}{\sqrt{25}}$

$d_{P,r} = \dfrac{38}{5}$

3. Calcule a altura relativa ao vértice A do triângulo de vértices A(6, 11), B(4, 7) e C(7, 3).

r:

$\overline{BC}: \begin{vmatrix} 4 & 7 \\ 7 & 3 \\ x & y \\ 4 & 7 \end{vmatrix}$ $12 + 7y + 7x - 4y - 3x - 49 = 0$

$r: 4x + 3y - 37 = 0$

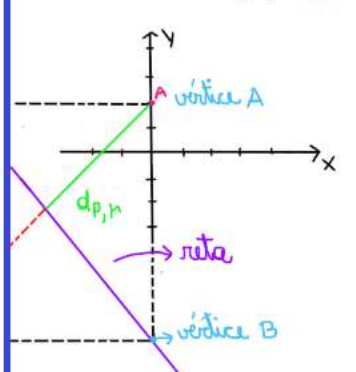
$d_{P,r} = \dfrac{|4.6+3.11-37|}{\sqrt{4^2+3^2}}$

$d_{P,r} = \dfrac{|24+33-37|}{\sqrt{25}}$

$d_{P,r} = \dfrac{20}{5}$

$d_{P,r} = 4$

4. Calcule a diagonal (d) e o lado (ℓ) de um quadrado que tem um vértice A(0, 2) e uma diagonal na reta $(r)\ x + y + 8 = 0$.



$d_{P,r} = \dfrac{|1.0+1.2+8|}{\sqrt{1^2+1^2}} \rightsquigarrow d_{P,r} = \dfrac{10}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}}$

$d_{P,r} = \dfrac{10\sqrt{2}}{2} \rightarrow d_{P,r} = 5\sqrt{2}$

A diagonal será $2 \cdot d_{P,r}$:

$d = 2 \cdot 5\sqrt{2} \rightarrow d = 10\sqrt{2}$

Por Pitágoras:

$\ell^2 + \ell^2 = d^2 \rightarrow (10\sqrt{2})^2 = 2\ell^2$

$200 = 2\ell^2$

$\ell^2 = 100 \rightarrow \ell = 10$

Calcule a distância entre as retas paralelas r e s, para:

5. $(r)\ 4x - 3y - 1 = 0$ e $(s)\ 4x - 3y + 9 = 0$.

Fazendo $P(x=0, y)$

$r: 4.0 - 3.y - 1 = 0$

$y = -1/3$

$d_{P,r} = \dfrac{|4.0 - 3.(-1/3)+9|}{\sqrt{4^2+3^2}}$

$d_{P,r} = \dfrac{10}{\sqrt{25}}$

$d_{P,r} = \dfrac{10}{5} \rightarrow d_{P,r} = 2$

6. $(r)\ x + 5y + 5 = 0$ e $(s)\ 4x + 20y + 5 = 0$.

Fazendo $P(x=0, y)$

$r: x.0 + 5y + 5 = 0$

$5y = -5$

$y = -1$

$P(0,-1)$

$r \rightarrow 4x + 20y + 5 = 0$

$d_{P,r} = \dfrac{|4.0 + 20.(-1)+5|}{\sqrt{4^2+20^2}}$

$d_{P,r} = \dfrac{|-15|}{\sqrt{416}}$

$d_{P,r} = \dfrac{15}{4\sqrt{26}} \cdot \dfrac{\sqrt{26}}{\sqrt{26}}$

$\rightarrow d_{P,r} = \dfrac{15\sqrt{26}}{104}$

7. Determine um ponto do eixo dos x, equidistante das retas $(r)\ 2x - 3y - 5 = 0$ e $(s)\ 3x - 2y - 5 = 0$.

$d_{P,r_1} = d_{P,r_2}$

$P(x,0)$

$d_{P,r_1} = \dfrac{|2x-3.0-5|}{\sqrt{2^2+3^2}} \rightarrow \dfrac{|2x-5|}{\sqrt{13}}$

$d_{P,r_2} = \dfrac{|3.x-2.0-5|}{\sqrt{2^2+3^2}} \rightarrow \dfrac{|3x-5|}{\sqrt{13}}$

$d_{P,r_1} = d_{P,r_2} \rightsquigarrow \dfrac{|2x-5|}{\sqrt{13}} = \dfrac{|3x-5|}{\sqrt{13}}$

$|2x-5| = |3x-5|$

- $|2x-5| \geq 0$ e $|3x-5| \geq 0 \rightarrow 2x-5 = 3x-5$

$x = 0$

$|2x-5| < 0$ e $|3x-5| \geq 0 \rightarrow -(2x-5) = 3x-5$ (inverte o sinal)

$5x = 10$

ou

$x = 2$

$|2x-5| \geq 0$ e $|3x-5| < 0$

P(0,0) ou P(2,0), são pontos equidistantes de r e s.