

1. $xx_1 + yy_1 = \rho^2$ $x^2 + y^2 = \rho^2$ $A(x_1, y_1)$ 15

2. $\vec{\alpha} // \vec{\beta} \Leftrightarrow \lambda_1 \lambda_2 = -1$, λ_1, λ_2
 $y = 3x + 1$ $3x + y = 4$
 $y = \kappa^2 x + 1$
 $(x - x_0)^2 + (y - y_0)^2 = \rho$
 $\vec{r} = \vec{r}_0 + \vec{v}t$



1. $\vec{r} = \vec{r}_0 + \vec{v}t$ $\vec{v} = \frac{1}{3}(\vec{i}, \vec{j})$ $|\vec{v}| = \sqrt{2}$, $|\vec{r}| = 2\sqrt{2}$ 8

2. $2\vec{r} + \vec{s} = \vec{t} + \vec{u}$ 10

3. $2\vec{r} + \vec{s} = \vec{t} + \vec{u}$ 7

ABΓ $A(0,2)$, $B(1,3)$
 ΑΓ: $x + 3y - 6 = 0$ ΒΓ: $x + y - 4 = 0$
 1. Γ $\Gamma(3,1)$ 6

2. 7

3. 6

4. 6



1. $A(3,-4)$ $3x - 2y + 9 = 0$ $x^2 + y^2 = \rho^2$ 6

2. 1 $y = x$ 6

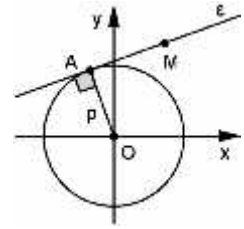
3. $B(-3,0)$ $\Gamma(1,6)$, C 6

4. C $y = x$ 7

6

μ

1. C: $x^2 + y^2 = \rho^2$ μ $A(x_1, y_1)$.
 μ $M(x, y)$ μ $\overline{OA} \perp \overline{AM}$. μ $\overline{OA}, \overline{AM}$ μ
 μ (x_1, y_1) μ $(x - x_1, y - y_1)$, μ :
 $\overline{OA} \perp \overline{AM} \Leftrightarrow \overline{OA} \cdot \overline{AM} = 0 \Leftrightarrow$
 $x_1(x - x_1) + y_1(y - y_1) = 0 \Leftrightarrow x_1x - x_1^2 + y_1y - y_1^2 = 0 \Leftrightarrow x_1x + y_1y = x_1^2 + y_1^2$ (1)
 μ $x_1^2 + y_1^2 = \rho^2$, (1) μ : $xx_1 + yy_1 = \rho^2$.



A2.)))))

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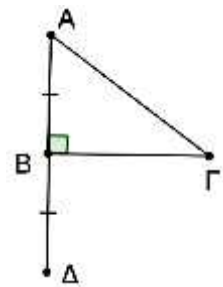
1. $\vec{\alpha} \cdot \vec{\beta} = |\vec{\alpha}| \cdot |\vec{\beta}| \cdot \cos(\hat{\alpha}, \hat{\beta}) = \sqrt{2} \cdot 2\sqrt{2} \cdot \cos \frac{\pi}{3} = 4 \cdot \frac{1}{2} = 2$.
 2. $(2\vec{\alpha} + \vec{\beta}) \perp (\kappa\vec{\alpha} + \vec{\beta}) \Leftrightarrow (2\vec{\alpha} + \vec{\beta}) \cdot (\kappa\vec{\alpha} + \vec{\beta}) = 0 \Leftrightarrow$
 $2\kappa|\vec{\alpha}|^2 + 2\vec{\alpha} \cdot \vec{\beta} + \kappa\vec{\alpha} \cdot \vec{\beta} + |\vec{\beta}|^2 = 0 \Leftrightarrow 4\kappa + 4 + 2\kappa + 8 = 0 \Leftrightarrow 6\kappa = -12 \Leftrightarrow \kappa = -2$
 3. $|2\vec{\alpha} + \vec{\beta}|^2 = (2\vec{\alpha} + \vec{\beta}) \cdot (2\vec{\alpha} + \vec{\beta}) = 4|\vec{\alpha}|^2 + 4\vec{\alpha} \cdot \vec{\beta} + |\vec{\beta}|^2 = 4 \cdot 2 + 8 + 8 = 24 \Leftrightarrow |2\vec{\alpha} + \vec{\beta}| = \sqrt{24} = 2\sqrt{6}$

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μ

1. μ : μ $\Gamma(3,1)$.

$$\begin{cases} x + 3y - 6 = 0 \\ x + y - 4 = 0 \end{cases} \Leftrightarrow \begin{cases} 4 - y + 3y - 6 = 0 \\ x = 4 - y \end{cases} \Leftrightarrow \begin{cases} 2y = 2 \\ x = 4 - y \end{cases} \Leftrightarrow \begin{cases} y = 1 \\ x = 3 \end{cases}$$



2. $\lambda_{AB} = \frac{3-2}{1-0} = 1$, $\lambda_{B\Gamma} = \frac{1-3}{3-1} = -1$ $\lambda_{AB}\lambda_{B\Gamma} = -1$, $AB \perp B\Gamma$,

: $y - 2 = 1(x - 0) \Leftrightarrow y = x + 2$

3. μμ , μ :
 $x_B = \frac{x_A + x_\Delta}{2} \Leftrightarrow x_\Delta = 2x_B - x_A = 2$ $y_B = \frac{y_A + y_\Delta}{2} \Leftrightarrow y_\Delta = 2y_B - y_A = 4$, $\Delta(2,4)$.

4. (x, y) μ .

$d(M, A\Gamma) = d(M, B\Gamma) \Leftrightarrow \frac{|x + 3y - 6|}{\sqrt{1^2 + 3^2}} = \frac{|x + y - 4|}{\sqrt{1^2 + 1^2}} \Leftrightarrow \frac{|x + 3y - 6|}{\sqrt{10}} = \frac{|x + y - 4|}{\sqrt{2}} \Leftrightarrow \frac{|x + 3y - 6|}{\sqrt{2}\sqrt{5}} = \frac{|x + y - 4|}{\sqrt{2}} \Leftrightarrow$

$|x + 3y - 6| = \sqrt{5}|x + y - 4| \Leftrightarrow x + 3y - 6 = \pm\sqrt{5}(x + y - 4) \Leftrightarrow$

$\delta_1: x + 3y - 6 = x\sqrt{5} + y\sqrt{5} - 4\sqrt{5} \Leftrightarrow (1 - \sqrt{5})x + (3 - \sqrt{5})y - 6 + 4\sqrt{5} = 0$

$$\delta_2 : x + 3y - 6 = -x\sqrt{5} - y\sqrt{5} + 4\sqrt{5} \Leftrightarrow (1 + \sqrt{5})x + (3 + \sqrt{5})y - 6 - 4\sqrt{5} = 0$$

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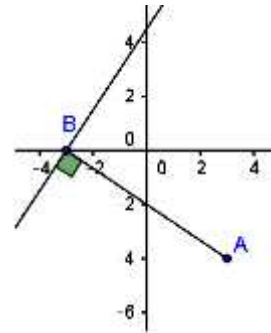
1. $y = 0 \quad 3x + 9 = 0 \Leftrightarrow x = -3, \quad B(-3, 0)$

$$d(A, \varepsilon) = \frac{|3 \cdot 3 - 2(-4) + 9|}{\sqrt{3^2 + (-2)^2}} = \frac{26}{\sqrt{13}} = 2\sqrt{13}$$

$$(AB) = \sqrt{(-3-3)^2 + (0-4)^2} = \sqrt{52} = 2\sqrt{13},$$

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2. $\Gamma(x_1, y_1), \quad 3x_1 - 2y_1 + 9 = 0 \Leftrightarrow y_1 = \frac{3x_1 + 9}{2} = \frac{3}{2}(x_1 + 3).$

$$(B\Gamma) = (AB) \Leftrightarrow \sqrt{(x_1 + 3)^2 + (y_1 - 0)^2} = \sqrt{(3 + 3)^2 + (-4 + 0)^2} \Leftrightarrow$$

$$(x_1 + 3)^2 + \left[\frac{3}{2}(x_1 + 3)\right]^2 = 52 \Leftrightarrow (x_1 + 3)^2 + \frac{9}{4}(x_1 + 3)^2 = 52 \Leftrightarrow$$

$$4(x_1 + 3)^2 + 9(x_1 + 3)^2 = 208 \Leftrightarrow 13(x_1 + 3)^2 = 208 \Leftrightarrow (x_1 + 3)^2 = 16 \Leftrightarrow$$

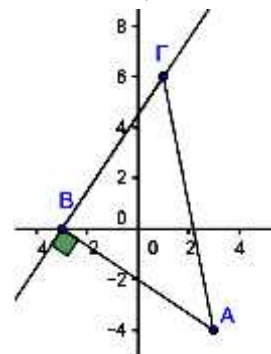
$$x_1 + 3 = \pm 4.$$

$$x_1 + 3 = 4 \Leftrightarrow x_1 = 1 \quad y_1 = \frac{3}{2}(1 + 3) = 6 \quad \Gamma(1, 6).$$

$$x_1 + 3 = -4 \Leftrightarrow x_1 = -7$$

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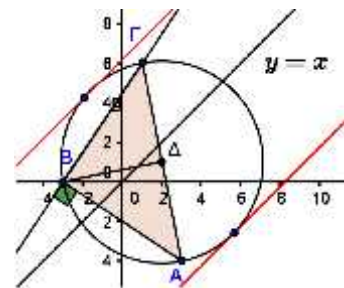
3. $x_{\Delta} = \frac{x_A + x_{\Gamma}}{2} = \frac{3 + 1}{2} = 2 \quad y_{\Delta} = \frac{y_A + y_{\Gamma}}{2} = \frac{-4 + 6}{2} = 1, \quad \Delta(2, 1).$

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$$\rho = (A\Delta) = \sqrt{(3-2)^2 + (-4-1)^2} = \sqrt{26},$$

$$(x-2)^2 + (y-1)^2 = (\sqrt{26})^2 = 26$$



4. $y = x \quad \lambda = 1$

$$\mu : y = x + \beta \Leftrightarrow x - y + \beta = 0$$

C μ :

$$d(\Delta, \varepsilon) = \rho \Leftrightarrow \frac{|2 - 1 + \beta|}{\sqrt{1^2 + (-1)^2}} = \sqrt{26} \Leftrightarrow |\beta + 1| = \sqrt{52} \Leftrightarrow \beta + 1 = \pm\sqrt{52} \Leftrightarrow \beta = -1 \pm \sqrt{52},$$

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$$x - y - 1 + \sqrt{52} = 0 \quad x - y - 1 - \sqrt{52} = 0.$$

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