MATE - INFO

SI

$i^2 = -1$

1) $z = \frac{3+2i}{2-3i} = \frac{6+4i+9i+6i^2}{2^2-(3i)^2} = \frac{6+13i-6}{4+9} = \frac{13i}{13} = i$

$\operatorname{Re} z = 0$

2) $f: \mathbb{R} \to \mathbb{R}$, $f(x) = x^2 + x - a$. $Gf \cap Ox \iff \Delta = 0$

$\Delta = 1 + 4a \Rightarrow 1 + 4a = 0 \Rightarrow a = -\frac{1}{4}$;

3) $2^{2x} + 3 \cdot 4^x - 16 = 0 \iff 4^x + 3 \cdot 4^x - 16 = 0 \Rightarrow$

$4^x = t$

$\Rightarrow t + 3t - 16 = 0 \Rightarrow 4t = 16 \Rightarrow t = 4 \Rightarrow 4^x = 4 \Rightarrow x = 1$

4) $A = \{1, 2, 3, 4, 5, 6, 7\}$

submulțimi cu 2 elemente $\Rightarrow C_7^2 = \frac{7!}{2! \cdot 5!} = \frac{6 \cdot 7}{2} = \frac{42}{2} = 21$

$1, 3, 5, 7 : C_4^1$; $2, 4, 6 : C_3^1$

$P = \frac{C_4^1 \cdot C_3^1}{21} = \frac{\frac{4!}{1! \cdot 3!} \cdot \frac{3!}{1! \cdot 2!}}{21} = \frac{4 \cdot 3}{21} = \frac{12}{21}$

5) $M(2,3)$; $N(4,1)$ $m_{MN} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1-3}{4-2} = \frac{-2}{2} = -1$

$MN \perp d \Rightarrow m_{MN} \cdot m = -1 \Rightarrow -1 \cdot m = -1 \Rightarrow \boxed{m = 1}$

Fie P mijl lui $MN \Rightarrow P\left(\frac{2+4}{2}; \frac{3+1}{2}\right) \Rightarrow P(3; 2)$

$y - y_P = m(x - x_P) \Rightarrow y - 2 = 1(x - 3) \Rightarrow y - 2 - x + 3 = 0$

$-x + y + 1 = 0 \mid \cdot(-1)$

$x - y - 1 = 0$

6) $(\sin x + \underbrace{\sin(\pi - x)}_{\sin x})^2 + (\cos x + \underbrace{\cos(2\pi - x)}_{\cos x})^2 = 4$

$(2\sin x)^2 + (2\cos x)^2 = 4 \Rightarrow 4\sin^2 x + 4\cos^2 x = 4 \Rightarrow 4(\underbrace{\sin^2 x + \cos^2 x}_{1}) = 4$

$\Rightarrow 4 \cdot 1 = 4.$