

BAREM TEST II

SUBIECTUL I (30 puncte)

1.	2,x+2,10 sunt termeni consecutivi intr-o progresie geometrica $\leftrightarrow (x + 2)^2 = 20 \rightarrow x^2 + 4x + 4 = 20 \rightarrow x = \frac{-4 \pm 4\sqrt{5}}{2}$	3p 2p
2.	$y_{min} = -\frac{\Delta}{4a} \rightarrow \Delta = 4 + 40 = 44 \rightarrow y_{min} = -11$	5p
3.	$x^2 - 2x > 0 \rightarrow x \in (-\infty, 0) \cup (2, \infty)$ $x^2 - 2x = 8 \rightarrow x_1 = 4 \text{ si } x_2 = -2$	2p 3p
4.	Nr cazuri posibile 90 Nr cazuri favorabile 45 $p = \frac{\text{nr cazuri fav}}{\text{nr cazuri posibile}} = \frac{1}{2}$	2p 2p 1p
5.	$A_{\Delta ABC} = \frac{1}{2}  \Delta $ $\Delta = \begin{vmatrix} -2 & 0 & 1 \\ 2 & 0 & 1 \\ 0 & 3 & 1 \end{vmatrix} = -2 + 6 + 0 - 0 + 6 - 0 = -2$ $A_{\Delta ABC} = 1$	3p 2p
6.	$E\left(\frac{\pi}{2}\right) = \cos \frac{\pi}{2} + \sin \frac{\pi}{4} =$ $= 0 + \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$	3p 2p

SUBIECTUL al II-lea(30 puncte)

1.a)	$\det A = \begin{vmatrix} 2 & 3 \\ 3 & 2 \end{vmatrix} = 4 - 9 = -5$	5p
b)	$AB = \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix} \begin{pmatrix} x & 1 \\ 1 & x \end{pmatrix} = \begin{pmatrix} 2x + 3 & 3x + 2 \\ 3x + 2 & 2x + 3 \end{pmatrix}$ $BA = \begin{pmatrix} x & 1 \\ 1 & x \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix} = \begin{pmatrix} 2x + 3 & 3x + 2 \\ 3x + 2 & 2x + 3 \end{pmatrix}$	2p 3p
c)	$AA = \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix} = \begin{pmatrix} 13 & 12 \\ 12 & 13 \end{pmatrix}$	2p 1p

	$3(A+B) = \begin{pmatrix} 3x+6 & 12 \\ 12 & 3x+6 \end{pmatrix}$ $\begin{pmatrix} 13 & 12 \\ 12 & 13 \end{pmatrix} - \begin{pmatrix} 3x+6 & 12 \\ 12 & 3x+6 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ $13-3x-6=1 \rightarrow x=2$	1p 1p
2.a)	$1 * (-3) = \frac{1}{3} 1(-3) + 1 - 3 = -3$	5p
b)	$\frac{1}{3}(x+3)(y+3) - 3 = \frac{1}{3}(xy + 3x + 3y + 9) - 3 =$ $= \frac{1}{3}xy + x + y + 3 - 3 = x * y$	3p 2p
c)	$x * \frac{1}{x} = -3 \leftrightarrow \frac{1}{3}x \frac{1}{x} + x + \frac{1}{x} = -3 \leftrightarrow 3x^2 + 10x + 3 = 0$ $x_1 = -\frac{1}{3} \text{ si } x_2 = -3$	3p 2p

SUBIECTUL al III-lea (30 puncte)

1.a)	$f'(x) = 3x^2 - 3 =$ $= 3(x-1)(x+1)$	3p 2p
b)	$\lim_{x \rightarrow 0} \frac{x^3 - 3x + 3x}{x} = \lim_{x \rightarrow 0} x^2 = 0$	5p
c)	<p>f este descrescatoare pe <math>[-1, 1] \rightarrow f(x) \geq f(1) = -2</math></p> <p>f este crescatoare pe <math>[1, \infty) \rightarrow f(x) \geq f(1) = -2</math></p> <p><math>f(x) \geq -2</math>, oricare ar fi <math>x \in [-1, \infty)</math></p>	2p 2p 1p
2.a)	$\int_0^1 (f(x) - x - 1) dx = \int_0^1 x^4 dx =$ $\frac{x^{5^1}}{5_0} = \frac{1}{5}$	3p 2p
b)	$\int_1^e (x^4 + x + 1 - x^4 - 1) \ln x dx = \int_1^e x \ln x dx =$ $= \frac{x^2 \ln x}{2} \Big _1^e - \int_1^e \frac{x}{2} dx = \frac{e^2}{2} - \frac{e^2}{4} + \frac{1}{4} = \frac{e^2 + 1}{4}$	2p 3p
c)	$\int_0^1 (x^4 + x + 1) dx = \frac{x^{5^1}}{5_0} + \frac{x^{2^1}}{2_0} + x_0^1 =$ $= \frac{1}{5} + \frac{1}{2} + 1 = \frac{17}{10}$	3p 2p