

Mate 2000 Consolidare
Clasa a VII-a, semestrul II (2022-2023)
TESTE DE AUTOEVALUARE

– SOLUȚII –

Test de autoevaluare – p. 19

- I.** 1. -3 .
2. 39 .
3. $x \in \{-8; 13\}$.
4. -4 .
5. -6 .
6. -3 .
- II.** 1. B. 2. C. 3. B. 4. D.
- III.** 1. $x \in \{-27; -15; -9; 3\}$.
2. -2 .
3. -2 .
4. $x \in \{-8; 3\}$.

Test de autoevaluare – p. 39

- I.** 1. $(2; -2)$.
2. $(a; b) = (1; 3)$.
3. 12 .
4. $a = 5$.
5. 8 .
6. $(-3; 1)$.
- II.** 1. D. 2. C. 3. A. 4. C.
- III.** 1. $(5; -3)$.
2. $f = 80; b = 28$.
3. $a = 135; b = 105$.
4. $a = 18; b = 24; c = 36$.

Test de autoevaluare – p. 51

- I.**
1. 5.
 2. $a \in \{-6; 6\}$.
 3. $x_M = -1; y_M = 7$.
 4. $a = -7; b = 16$.
 5. $5\sqrt{5} + 15$.
 6. $a \in \{1; 5\}$.
- II.** 1. D. 2. C. 3. A. 4. D.
- III.**
1. $AB = 2\sqrt{2}; BC = \sqrt{2}; AC = 3\sqrt{2}; AB + BC = AC \Rightarrow A, B, C$ coliniare.
 2. b) $EF = 5; EG = 2\sqrt{5}; GH = 5$.
 3. $a = 3; b = -7$.
 4. $\mathcal{P} = 2\sqrt{37} + \sqrt{74}; \mathcal{A} = \frac{37}{2}$.

Test de autoevaluare – p. 71

- I.**
1. $\frac{5}{3}$.
 2. 27,5.
 3. $\frac{3}{4}$.
 4. $\frac{2}{3}$.
 5. $\frac{1}{11}$.
 6. 6.
- II.** 1. C. 2. B. 3. C. 4. D.
- III.**
1.
$$\left. \begin{array}{l} \Delta ACD : OM \parallel CD \Rightarrow \frac{OC}{OA} = \frac{MD}{AM} \\ \Delta ABC : ON \parallel AB \Rightarrow \frac{OC}{OA} = \frac{CN}{BN} \end{array} \right\} \Rightarrow \frac{CN}{BN} = \frac{OC}{OA} = \frac{MD}{AM} = \frac{3}{5}. \text{ În } \Delta BCD : ON \parallel DC \Rightarrow$$

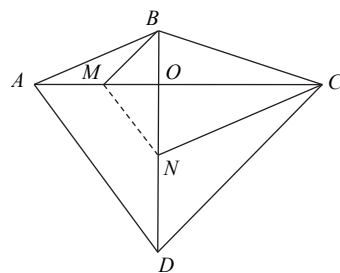
$$\Rightarrow \frac{OD}{OB} = \frac{CN}{BN} \Rightarrow \frac{OD}{OB} = \frac{3}{5} \Rightarrow OD = 21 \text{ cm și } OB = 35 \text{ cm.}$$
 2. Fie $AC \cap BD = \{O\}$. În ΔOCD , $BM \parallel CD \Rightarrow$

$$\Rightarrow \frac{OM}{OC} = \frac{OB}{OD} \quad (1). \text{ În } \Delta AOB, CN \parallel AB \Rightarrow$$

$$\Rightarrow \frac{ON}{OB} = \frac{OC}{OA} \quad (2). \text{ Înmulțind egalitățile (1) și (2)}$$

membru cu membru se obține: $\frac{OM}{OC} \cdot \frac{OC}{OA} =$

$$= \frac{OB}{OD} \cdot \frac{ON}{OB} \Rightarrow \frac{OM}{OA} = \frac{ON}{OD} \Rightarrow MN \parallel AD.$$



3. $ADME$ este dreptunghi ($\sphericalangle A = \sphericalangle D = \sphericalangle E = 90^\circ$) $\Rightarrow ME = AD, MD = AE; MD \parallel AC \Rightarrow$
 $\Rightarrow \frac{AD}{AB} = \frac{CM}{BC} \Rightarrow \frac{ME}{AB} = \frac{CM}{BC}$ (1); $ME \parallel AB \Rightarrow \frac{CM}{BC} = \frac{CE}{AC}$; AM – mediană \Rightarrow
 $\Rightarrow AM = \frac{BC}{2} = CM = BM$; cum $ME \perp AC \Rightarrow ME$ este mediană în $\triangle AMC \Rightarrow$
 $\Rightarrow CE = AE \Rightarrow \frac{CM}{BC} = \frac{AE}{AC} \Rightarrow \frac{CM}{BC} = \frac{MD}{AC}$ (2). Din (1) și (2) $\Rightarrow \frac{ME}{AB} = \frac{MD}{AC} \Rightarrow$
 $\Rightarrow \frac{ME}{MD} = \frac{AB}{AC}$.
4. Cum $PM \parallel BC$, aplicând teorema lui Thales obținem $\frac{PB}{AB} = \frac{CM}{AC}$ (1). Cum $MN \parallel AB$,
 aplicând teorema lui Thales obținem $\frac{NB}{BC} = \frac{AM}{AC}$ (2). Din (1) și (2) rezultă
 $\frac{PB}{AB} + \frac{NB}{BC} = \frac{CM}{AC} + \frac{AM}{AC} = \frac{AC}{AC} = 1$.

Test de autoevaluare – p. 79

- I.** 1. 20 cm și 28 cm.
 2. 60 cm.
 3. romb.
 4. 21 cm.
 5. 95 cm.
 6. 60° .

- II.** 1. C. 2. A. 3. D. 4. B.

- III.** 1. $\triangle PDC \sim \triangle PAB$ ($DC \parallel AB$) $\Rightarrow \frac{PD}{PA} = \frac{PC}{PB} = \frac{DC}{AB} \Rightarrow \frac{PD}{PA} = \frac{PC}{PB} = \frac{1}{3} \Rightarrow \frac{PA-18}{PA} =$
 $= \frac{PB-24}{PB} = \frac{1}{3} \Rightarrow PA = 27$ cm; $PB = 36$ cm; $\mathcal{P}_{PAB} = 111$ cm.
2. $\triangle NAP \sim \triangle NDC$ ($PA \parallel CD$) $\Rightarrow \frac{AN}{DN} = \frac{AP}{CD} \Rightarrow \frac{n}{n+l} = \frac{AP}{l}$ (1); $\triangle MBP \sim \triangle MCD$
 ($PB \parallel CD$) $\Rightarrow \frac{MB}{MC} = \frac{PB}{CD} \Rightarrow \frac{m}{m+l} = \frac{PB}{l}$ (2). Adunând membru cu membru
 relațiile (1) și (2) se obține: $\frac{n}{n+l} + \frac{m}{m+l} = 1 \Rightarrow \frac{n}{n+l} = \frac{l}{m+l} \Rightarrow \frac{l}{n} = \frac{m}{l} \Rightarrow$
 $\Rightarrow l^2 = mn \Rightarrow l = \sqrt{mn}$.
3. Die $D \in (AB)$ astfel încât $BD \equiv CD$. $\triangle DGM \sim \triangle DAB$ ($GM \parallel AB$) $\Rightarrow \frac{DG}{AD} = \frac{GM}{AB} =$
 $= \frac{DM}{BD} \Rightarrow \frac{DM}{BD} = \frac{1}{3}$ (1); $\triangle DGN \sim \triangle DAC$ ($GN \parallel AC$) $\Rightarrow \frac{DG}{AG} = \frac{GN}{AC} = \frac{DN}{DC} \Rightarrow$
 $\Rightarrow \frac{DN}{DC} = \frac{1}{3}$ (2). Din (1) și (2) $\Rightarrow \frac{DM+DN}{BD} = \frac{2}{3} \Rightarrow \frac{MN}{24} = \frac{2}{3} \Rightarrow MN = 16$ cm.
4. $\mathcal{P}_{ABD} = 37$ cm.

Test de autoevaluare – p. 97

- I.** 1. 28.
2. 18.
3. 36.
4. 24.
5. 60.
6. 60.
- II.** 1. D. 2. C. 3. D. 4. C.
- III.** 1. 864 cm^2 .
2. $BD = 32 \text{ cm}$; $CD = 72 \text{ cm}$; $BC = 104 \text{ cm}$.
3. $\mathcal{P} = 96 \text{ cm}$; $\mathcal{A} = 384 \text{ cm}^2$.
4. $\mathcal{A} = 1350 \text{ cm}^2$; $\mathcal{P} = 180 \text{ cm}$.

Test de autoevaluare – p. 109

- I.** 1. 35.
2. $6\sqrt{2}$.
3. 24.
4. 32.
5. 36.
6. $12\sqrt{2}$.
- II.** 1. C. 2. D. 3. B. 4. A.
- III.** 1. 24 cm , $\frac{144}{5} \text{ cm}$.
2. a) $AA' = 45 \text{ cm}$; b) $\mathcal{P} = 30 + 6\sqrt{73} + 12\sqrt{13} \text{ cm}$.
3. a) 12 cm ; b) $AC = 12\sqrt{10} \text{ cm}$; c) $d(B, AC) = \frac{26\sqrt{10}}{5} \text{ cm}$.

Test de autoevaluare – p. 111

- I.** 1. 40.
2. $18(\sqrt{3} + 1)$.
3. 50.
4. 120.
5. $12\sqrt{3}$.
6. 36.
- II.** 1. D. 2. B. 3. B. 4. D.
- III.** 1. a) $AB = 60 \text{ cm}$; $AC = 80 \text{ cm}$; $BC = 100 \text{ cm}$; b) $AD = 48 \text{ cm}$.

2. $AB = 9\sqrt{5}$ cm; $AC = 18\sqrt{5}$ cm; $BC = 45$ cm; $\sphericalangle BAC = 90^\circ$, deoarece $AB^2 + AC^2 = BC^2$.
3. a) 48 cm; 90 cm; 102 cm; b) $\frac{720}{17}$ cm.
4. a) 12 cm; b) $AC = 12\sqrt{2}$ cm; $BD = 20$ cm.

Test de autoevaluare – p. 129

- I.** 1. 48.
2. 15.
3. 40.
4. 120° .
5. $18\sqrt{3}$.
6. 18.
- II.** 1. C. 2. D. 3. B. 4. D.
- III.** 1. $AC = BD = 8\sqrt{3}$; $R = 8$ cm.
2. $\triangle FAH \equiv \triangle GCM \equiv \triangle EBN$ (L.U.L.) $\Rightarrow \mathcal{A}_{FAH} = \mathcal{A}_{GCM} = \mathcal{A}_{EBN} = 9\sqrt{3}$ cm²; $\mathcal{A}_{ABC} = 9\sqrt{3}$ cm²; $\mathcal{A}_{BCMN} = 36$ cm²; $\mathcal{A}_{EFHGMN} = 36(3 + \sqrt{3})$ cm².
3. $\mathcal{A}_{EFGH} = 36$ cm².
4. a) $\mathcal{A} = 108(4 + \sqrt{3})$ cm²; b) $OQ = 6(\sqrt{3} + 1)$ cm; c) $\sphericalangle OCN = 75^\circ$.

Test de autoevaluare – p. 139

- I.** 1. 432.
2. $144\sqrt{3}$.
3. 288.
4. 432.
5. 192.
6. $864\sqrt{3}$.
- II.** 1. B. 2. D. 3. B. 4. D.
- III.** 1. $\mathcal{A}_{EFC} = 240$ cm²; $d(E, FC) = 8\sqrt{5}$ cm.
2. $\mathcal{A}_{ABCD} = 2700$ cm².
3. $\mathcal{A}_{ABCD} = 504$ cm².
4. a) $\mathcal{P} = 12(5 + \sqrt{3} + \sqrt{2})$ cm; $AC = 12\sqrt{6}$ cm; $BD = 12\sqrt{11}$ cm;
b) $\mathcal{A}_{ABCD} = 360\sqrt{2}$ cm².