

Mate 2000 Consolidare
Clasa a VIII-a, partea I (2025-2026)

TESTE DE AUTOEVALUARE

– SOLUȚII –

Test de autoevaluare – p. 19

I. 1. $a \in \{1, 3, 7, 9\}$.

2. 2.

3. $x \in \{0, 1, 2\}$.

4. $x = 20$.

5. 2,3(5).

6. F.

II. 1. D. 2. B. 3. B. 4. B.

III. 1. $a = \sqrt{729} = 27 \in \mathbb{Q}$.

2. $A = \{-7, -2, -1, 0, 1, 2, 3, 8\}, B = \{-11, -4, -2, -1, 0, 1, 3, 10\};$

$A \cap B = \{-2, -1, 0, 1, 3\}$.

3. $\frac{2+\sqrt{3}+7-\sqrt{3}}{2x-1} = \frac{9}{2x-1} \in \mathbb{Z} \Rightarrow x \in \{-4, -1, 0, 1, 2, 5\}$.

4. $\sqrt{\frac{a+b}{9}} \in \mathbb{Q} \Rightarrow a+b=9 \Rightarrow (a, b) \in \{(1, 8), (2, 7), (3, 6), (4, 5)\}$.

Test de autoevaluare – p. 27

I. 1. 6,8.

2. -3,21.

3. 8.

4. $x \in \{9, 10, 11, 12\}$.

5. 1.

6. $x \in \{-1, 2\}$.

II. 1. B. 2. C. 3. D. 4. C.

III. 1. Pentru $-2 < x < 3 \Rightarrow |x-3| = -x+3$ și $|x+2| = x+2 \Rightarrow a = 5 \in \mathbb{N}$.

2. $x = -1, y = 3 \Rightarrow x < y$.

3. $x \in \{1, 2\}$.

4. $\sqrt{2ab} \in \mathbb{N} \Rightarrow \overline{ab} \in \{25, 56, 89\} \Rightarrow$ suma este 170 și $10 \mid 170$.

Test de autoevaluare – p. 41

I. 1. -4 .

2. $[1; 5]$.

3. $[-2; 3]$.

4. $\{0, 1, 2, 3\}$.

5. $(-6; 8]$.

6. -2 .

II. 1. B. 2. C. 3. B. 4. A.

III. 1. $A \cup B \cap \mathbb{Z} = \{-1, 0, 1, 2, 3, 4, 5, 6, 7\}$.

2. $A = \{2, 4\}; B = [1; 4); A \cap B = \{2\}$.

3. Dacă $x \in [-2; 5] \Rightarrow |x + 2| = x + 2$ și $|x - 5| = -x + 5 \Rightarrow a = 7 \in \mathbb{N}$.

4. $x \in [1; 3]$ și $y \in [-5; -3] \Rightarrow x > y$.

Test de autoevaluare – p. 47

I. 1. $\{0, 1, 2, 3, 4, 5\}$.

2. $\{-2, -1, 0, 1, 2\}$.

3. $S = [-3; 3]$.

4. $S = (-2\sqrt{3} - 1; 1)$.

5. $S = (-\infty; 7) \setminus \{-5\}$.

6. $S = [-2; +\infty)$

II. 1. C. 2. B. 3. B. 4. C.

III. 1. $x \in [-5; 1]$.

2. $x \in (-2; 1) \setminus \{-1\}$.

3. $x \in \{0, 1, 2, 3, 4, 5\}$.

4. $x \in (-2; +\infty)$.

Test de autoevaluare – p. 65

I. 1. $-5x$.

2. $4x^2 + 2$.

3. $6x - 4$.

4. $x^2 + 5x$.

5. $x - 12$.

6. $30x^2$.

II. 1. C. 2. D. 3. C. 4. B.

- III.** 1. $a = x\sqrt{3} \Rightarrow x = \sqrt{3}$.
2. $x^2 + x - 20$.
3. $n = 9; x = 2\sqrt{6}; y = 6 - 3\sqrt{6}$.
4. 0.

Test de autoevaluare – p. 73

- I.** 1. $9x^2 + 4$.
2. $24x - 25$.
3. x^2 .
4. $8x + 13$.
5. 5.
6. -2.

II. 1. B. 2. B. 3. C. 4. C.

- III.** 1. -4.
2. $a = 21 \in \mathbb{N}$.
3. a) $E_1(x) = -8x + 8; E_2(x) = 12x + 12$; b) $E_1(n) + E_2(n) = 4(n + 5)$. Dacă $n = 2k + 1$,
 $k \in \mathbb{N} \Rightarrow E_1(n) + E_2(n) = 8(k + 3)$.
4. $a = |2x - y + 11| + |x - 2y - 15| - |x + y + 7|$ și, în condițiile date, avem $a = 2x - y + 11 - x + 2y + 15 - x - y - 7 \Rightarrow a = 19$.

Test de autoevaluare – p. 93

- I.** 1. $(5x - 4y)^2$.
2. $5x^2(3x^2 - 5x - 7)$.
3. $(x - 5)(x + 3)$.
4. $2(a - b)(2a + 2b + 1)$.
5. $(x - y - 2)(x - y + 2)$.
6. $x \in \{-5, 1\}$.

II. 1. D. 2. B. 3. B. 4. C.

- III.** 1. $x = \sqrt{3}$ și $y = -\sqrt{2}$.
2. $3(x + 1)(3x + 5)(3x + 7)$.
3. $(x + 2)(x - 1)(x + 3)(x - 2)$.
4. $a = -1; b = 4$.

Test de autoevaluare – p. 103

- I.**
1. $x \in \{-3, 3\}$.
 2. $x \in \mathbb{R} \setminus \{3\}$.
 3. $\frac{-14x + 2x^2}{-2x^2 + 6x}$.
 4. $\frac{x^2 - 4}{x^2 + 4x + 4}$.
 5. $\frac{1}{x + 3}$.
 6. $\frac{2x + 1}{x + 5}$.
- II.**
1. A.
 2. A.
 3. A.
 4. D.
- III.**
1. $\frac{(x+2)(x-1)}{x^2 + x + 1}$.
 2. Pentru $x \in \mathbb{R} \setminus \left\{-1, -\frac{3}{5}, 1\right\}$, $F(x) = \frac{1}{x-1}$.
 3. Pentru $x \in \mathbb{R} \setminus \{-5, 0\}$, $F(x) = \frac{x+5}{5x}$.
 4. a) $\frac{2x+3}{x-2}$; b) $A = \{-5, 1, 3, 9\}$.

Test de autoevaluare – p. 119

- I.**
1. necoplanare.
 2. 90 cm.
 3. 96 cm.
 4. $36\sqrt{3}$ cm².
 5. $R = 6$ cm; $G = 12$ cm.
 6. $G = 10$ cm.
- II.**
1. B.
 2. A.
 3. D.
 4. D.
- III.**
1. $\mathcal{P}_{ABC} = 36$ cm.
 2. $AC + AB' + BC' = 2(5 + \sqrt{34} + \sqrt{41})$ cm.
 3. $SA = 12$ cm.
 4. $G = 15$ cm; $h = 3\sqrt{21}$ cm.

Test de autoevaluare – p. 129

- I.** 1. paralele.
2. 0° .
3. necoplanare.
4. paralelă.
5. 45° .
6. 60° .
- II.** 1. B. 2. A. 3. D. 4. A.
- III.** 1. $AA' = 6$ cm; $MN \parallel (BA'C')$.
2. a) Cum O_1O_2 este linie mijlocie în $\triangle CAD' \Rightarrow O_1O_2 \parallel AD'$; b) 240 cm.
3. $DM = 6\sqrt{3}$ cm; $AM = 6\sqrt{6}$ cm. Cu reciproca teoremei lui Pitagora în $\triangle DAM$ dreptunghic, cu $\sphericalangle ADM = 90^\circ \Rightarrow DM \perp DA$.
4. a) $\text{tg}(\sphericalangle(VA, DC)) = \text{tg}(\sphericalangle(VA, AB)) = \text{tg}(\sphericalangle VAM) = \frac{4}{3}$;
b) $\sphericalangle(DC, VM) = \sphericalangle(AB, VM) = 90^\circ$.

Test de autoevaluare – p. 143

- I.** 1. paralele.
2. infinit.
3. unu.
4. unu.
5. unu.
6. perpendiculară.
- II.** 1. B. 2. C. 3. A. 4. B.
- III.** 1. $D'O = 6\sqrt{6}$ cm.
2. $d(M, (ABC)) = 20$ cm.
3. $MB = 24$ cm; $MC = 12\sqrt{6}$ cm; $d(C, (MAD)) = CD = 18$ cm.
4. $MB = MD = 6\sqrt{6}$ cm; $BD = 12\sqrt{2}$ cm; $\mathcal{P}_{MBD} = 12\sqrt{2}(1 + \sqrt{3})$ cm; $MO = 12$ cm;
 $\mathcal{A}_{MBD} = \frac{MO \cdot BD}{2} = 72\sqrt{2}$ cm². Fie $DN \perp MO$, $MO \perp DB \Rightarrow d(D, (MAC)) = DN$;
cum DN este înălțime în $\triangle MOD$ dreptunghic în $O \Rightarrow DN = \frac{MD \cdot DO}{MO} =$
 $= \frac{6\sqrt{6} \cdot 6\sqrt{2}}{12} = 6\sqrt{3}$ cm.

Test de autoevaluare – p. 149

- I.** 1. înălțimea prisme.
2. două.
3. 12 cm.
4. 20 cm.
5. 15 cm.
6. 10 cm.
- II.** 1. C. 2. A. 3. D. 4. C.
- III.** 1. $d(V, (ABC)) = 8$ cm.
2. a) $AB = 10$ cm; b) $d(C', (BDD')) = C'O' = 5\sqrt{2}$ cm.
3. $a = 6\sqrt{3}$; $b = 6$; $c = 3\sqrt{3}$.
4. $h = 4\sqrt{6}$ cm; $d(O, (SBC)) = \frac{4\sqrt{6}}{3}$ cm.

Test de autoevaluare – p. 159

- I.** 1. a) 30° ; b) 45° ; c) $\frac{\sqrt{2}}{2}$.
2. a) 45° ; b) 45° ; c) 45° .
3. a) 30° ; b) 30° ; c) $\frac{\sqrt{6}}{3}$.
- II.** 1. B. 2. A. 3. B. 4. A.
- III.** 1. $\text{pr}_{(BCC')} AC' = BC' = 6\sqrt{2}$ cm.
2. $\sphericalangle(A'C, (ABC)) = \sphericalangle A'CA = 60^\circ$.
3. $SO = 6$ cm.
4. a) $\sphericalangle(VB, (VAC)) = \sphericalangle OVB$; $\sphericalangle OVB = 45^\circ$;
b) $\sphericalangle(BC, (VAC)) = \sphericalangle BCO$; $\sphericalangle BCO = 45^\circ$.

Test de autoevaluare – p. 165

- I.** 1. unghi diedru.
2. perpendiculare.
3. 90° .
4. 0° .
5. a) 45° ; b) 90° .
- II.** 1. C. 2. C. 3. B. 4. A.
- III.** 1. a) $\sphericalangle((A'AB), (A'AC)) = \sphericalangle BAC = 60^\circ$;
b) $BC \perp AD, BC \perp AA' \Rightarrow BC \perp (A'AD) \Rightarrow (BCC') \perp (A'AD)$.
2. $\sphericalangle((B'AC), (ABC)) = m(\sphericalangle B'DB) = 60^\circ$.
3. $\sphericalangle((BA'C'), (DA'C')) = \sphericalangle BO'D$, unde $A'C' \cap B'D' = \{O'\}$. Se calculează $\mathcal{A}_{BDO'} = \frac{BD \cdot OO'}{2} = \frac{BO' \cdot DO' \cdot \sin(\sphericalangle BO'D)}{2}$, de unde $\sin(\sphericalangle BO'D) = \frac{2\sqrt{2}}{3}$.
4. Dacă $SABC$ – tetraedru regulat $\Rightarrow \triangle SAB$ și $\triangle SAC$ sunt echilaterale. Dacă M este mijlocul lui $SA \Rightarrow \sphericalangle((SAB), (SAC)) = \sphericalangle(BM, MC) = \sphericalangle BMC$.
 $\mathcal{A}_{MBC} = \frac{BC \cdot MD}{2} = \frac{BM \cdot MC \cdot \sin(\sphericalangle BMC)}{2}$, de unde $\sin(\sphericalangle BMC) = \frac{\sqrt{2}}{3}$.

Test de autoevaluare – p. 173

- I.** 1. a) $12\sqrt{2}$ cm; b) 45° ; c) $6\sqrt{2}$ cm.
2. 25 cm.
3. 24 cm.
4. $4\sqrt{6}$ cm.
- II.** 1. B. 2. B. 3. B. 4. B.
- III.** 1. a) $d(D', AC) = 8\sqrt{3}$ cm; b) $d(D', A'B) = \frac{16\sqrt{30}}{5}$ cm.
2. a) $d(A', BD) = 8\sqrt{2}$ cm; b) $\sphericalangle((A'BD), (ABC)) = 45^\circ$.
3. Dacă $D \in AB$ astfel încât $AD \equiv DB$, atunci se poate demonstra că $(VAD) \perp (VAB)$; fie $CM \perp VD \Rightarrow VM \perp (VAB)$. În $\triangle VDC$, $VO \cdot CD = VD \cdot CM$. Cum $CD = 9\sqrt{3}$ cm, $VD = 3\sqrt{7}$ cm $\Rightarrow CM = \frac{18\sqrt{21}}{7}$ cm.
4. $d(O, AB) = 5$ cm $\Rightarrow d(P, AB) = 10$ cm.