

**Mate 2000 Consolidare**  
**Clasa a VIII-a, partea a II-a, 2019-2020**  
**TESTE DE AUTOEVALUARE**

– SOLUȚII –

**Test de autoevaluare – p. 23**

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- I.** 1. 4.  
2. -1.  
3. 2.  
4. 3.  
5.  $\sqrt{3}$ .  
6.  $\{0, 1, 4, 9\}$ .

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

- III.** 1.  $x = 2$ .  
2.  $m = 2$ .  
3.  $f(x) = 3x - 5$ .  
4.  $S = 2013 \cdot 1004$ ;  $3 \mid 2013$  și  $4 \mid 1004 \Rightarrow 12 \mid S$ .

**Test de autoevaluare – p. 33**

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- I.** 1. -1.  
2. 3.  
3.  $S = \{-3; 3\}$ .  
4. 1.  
5. 3.  
6. -1.

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

- III.** 1.  $S = \{4\}$ .  
2.  $S = \{2\}$ .  
3.  $S = \{5\}$ .  
4.  $S = \{-2\sqrt{6}\}$ .

## Test de autoevaluare – p. 49

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- I.**
1.  $(2; -2)$ .
  2.  $a = 4; b = 3$ .
  3. 10.
  4. 5.
  5. 8 fete.
  6.  $(-3; 1)$ .
- II.** 1. D. 2. C. 3. B. 4. C.
- III.**
1.  $S = \{(5; -3)\}$ .
  2. 80 fete; 28 băieți.
  3. 3600 lei.
  4.  $x + 1 = 30k, k \in \mathbb{N}^*$ ; a) Pentru  $k = 4, x = 120 - 1 = 119$  (elevi);  
b) Numărul maxim este 179.

## Test de autoevaluare – p. 57

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- I.**
1.  $S \in \{-7, 3\}$ .
  2. 4.
  3.  $S = \left\{-1; \frac{5}{4}\right\}$ .
  4. -2.
  5.  $S = \left\{-\frac{5}{4}; \frac{3}{2}\right\}$ .
  6.  $m = 4; n = 3$ .
- II.** 1. B. 2. C. 3. D. 4. B.
- III.**
1.  $\Delta = (a^2 + 6a + 12)^2 - 4(a^2 + 6a + 9)$ . Se notează  $a^2 + 6a + 9 = t \Rightarrow \Delta = (t + 1)^2 + 8 > 0, \forall a \in \mathbb{R}$ .
  2.  $S = \{-13; 1\}$  pentru oricare  $x \in \mathbb{R} \setminus \left\{-\frac{1}{2}; 2\right\}$ .
  3. Ecuația  $2x^2 + 7x + 3 = 0$  are  $S = \left\{-3; -\frac{1}{2}\right\}$ , de unde  $m = 5$  și  $n = 3$ .
  4.  $\Delta = (m - n + 1)^2 + 4(m - n + 3)$ . Se notează  $m - n + 1 = t$  și atunci  $\Delta = t^2 + 4(t + 2) = (t + 2)^2 + 4 > 0$ , pentru oricare  $m$  și  $n$  numere reale.

## Test de autoevaluare – p. 65

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- I.** 1.  $\{0, 1, 2, 3, 4, 5\}$ .  
2.  $\{-2, -1, 0, 1, 2\}$ .  
3.  $[-3; 3]$ .  
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.  $S = [-5; 1]$ .  
2.  $S = (-2; 1) \setminus \{-1\}$ .  
3.  $x \in [-3; 3]$ .  
4.  $S = [-2; +\infty)$ .

## Test de autoevaluare 1 – p. 81

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- I.** 1. 25.  
2. 24.  
3.  $\{-3, -2, -1, 0, 1\}$ .  
4. 63.  
5.  $x = 1$ .  
6.  $y = -1$ .
- II.** 1. D. 2. B. 3. D. 4. D.
- III.** 1. a)  $a = 2; b = 6; f(x) = 2x + 6$ ; b) Se calculează aria  $\triangle ABM$  în două moduri, de unde distanța este  $2\sqrt{5}$ .  
2. a)  $E(x) = \frac{x+3}{2(x-1)}$ ; b)  $n \in \{-3, 0, 2, 3, 5\}$ .  
3. 2400 lei.  
4.  $x \in (-1; 7)$ .

## Test de autoevaluare 2 – p. 83

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- I.** 1. 120.  
2. 12.  
3. 0.  
4.  $S = \{-4; 2\}$ .  
5.  $M(2; 2)$ .  
6.  $x = 4$

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

**III.** 1.  $a = 2\sqrt{5}$ ;  $b = \frac{2\sqrt{5}}{5}$ ;  $m_a = \frac{6\sqrt{5}}{5}$ ;  $m_g = 2$ .

2. a)  $a = -2$ ;  $b = -1$ ;  $f(x) = -2x + 5$ ;  $g(x) = x - 1$ ; b)  $S = -5130$ .

3. 920 și 360.

4. a)  $F(x) = \frac{x-2}{x-5}$ ; b)  $a \in \{2, 4, 6, 8\}$ .

### Test de autoevaluare – p. 99

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**I.** 1.  $512 \text{ cm}^3$ .  
2. 15 cm.  
3.  $200\sqrt{3} \text{ cm}^3$ .  
4. 20 cm.  
5. 8 cm.  
6.  $6\sqrt{6} \text{ cm}$ .

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

**III.** 1. a)  $EC = 2\sqrt{13} \text{ cm}$ ;  $BC = 6 \text{ cm}$ ;  $\mathcal{A} = 264 \text{ cm}^2$ ;  $\mathcal{V} = 288 \text{ cm}^3$ ;  
b)  $BC' = 6\sqrt{2}$ ;  $d(A', BC') = A'O$ , unde  $BC' \cap B'C = \{O\}$ ;  $d(A', BC') = \sqrt{82} \text{ cm}$ .  
2. a)  $d(B', AC) = 12 \text{ cm}$ ;  
b)  $d(C', AD) = C'D$ ;  $C'D = 6\sqrt{2} \text{ cm}$ ;  
c)  $d(C, (CAD)) = CQ$ , unde  $CQ \perp C'D$ ;  $CQ = 3\sqrt{2} \text{ cm}$ .  
3. a)  $d(A, BD') = 6\sqrt{6} \text{ cm}$ ;  
b)  $d(A, CD') = 9\sqrt{6} \text{ cm}$ ;  
c) Dacă  $AC \cap BD = \{O\}$ ,  $\text{pr}_{(BDD')} AD' = D'O \Rightarrow \sphericalangle(AD', (BDD')) = \sphericalangle AD'O$ ;  
 $m(\sphericalangle AD'O) = 30^\circ$ .

### Test de autoevaluare – p. 111

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**I.** 1.  $75\sqrt{3} \text{ cm}^3$ .  
2. 10 cm.  
3. 24 cm.  
4.  $8\sqrt{2} \text{ cm}$ .  
5.  $6912 \text{ cm}^3$ .  
6.  $486\sqrt{3} \text{ cm}^3$ .

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

- III. 1.** a)  $\mathcal{A}_t = 36(\sqrt{39} + \sqrt{3}) \text{ cm}^2$ ;  $\mathcal{V} = 144\sqrt{3} \text{ cm}^3$ ; b)  $d(A, (VBC)) = \frac{36\sqrt{13}}{13} \text{ cm}$ ;
- c) Dacă  $MD \perp VA$ ,  $M \in (VA)$ ,  $MD = 9 \text{ cm}$ ;  $BM = 3\sqrt{13} \text{ cm}$ ;  $\sphericalangle((VAB), (VAD)) = \sphericalangle BMD$ ;  $\sin(\sphericalangle BMD) = \frac{2\sqrt{13}}{13}$ ;
- d)  $\mathcal{A}_{\Delta BEC} = \frac{BC \cdot ED}{2}$ ;  $\mathcal{A}_{\Delta BEC}$  minimă  $\Rightarrow ED$  minim  $\Rightarrow ED \perp VA$  și cum  $DM \perp VA \Rightarrow E = M \Rightarrow AE = 3\sqrt{3} \text{ cm}$ .
- 2.** a)  $\mathcal{A}_{ABCD} = \mathcal{A}_{\Delta VAC} \Rightarrow VO = 18\sqrt{2} \text{ cm}$ ;
- b)  $\mathcal{A} = 1296 \text{ cm}^2$ ;  $\mathcal{V} = 1944\sqrt{2} \text{ cm}^3$ ;
- c) Dacă  $VM \perp BC$  și  $VN \perp AD \Rightarrow \sphericalangle((VAD), (VBC)) = \sphericalangle MVN$ ;
- $$\frac{MN \cdot VO}{2} = \frac{VM \cdot VN \cdot \sin(\sphericalangle MVN)}{2} \Rightarrow \sin(\sphericalangle MVN) = \frac{4\sqrt{2}}{9} \Rightarrow \cos(\sphericalangle MVN) = \frac{7}{9}$$
- d)  $d(O, (VBC)) = OQ$ , unde  $OQ \perp VM$ ,  $OQ = 6\sqrt{2} \text{ cm}$ .

### Test de autoevaluare – p. 119

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- I.** 1.  $999\sqrt{3} \text{ cm}^3$ .
2.  $8\sqrt{2} \text{ cm}$ .
3.  $\frac{4\sqrt{3}}{3} \text{ cm}$ .
4.  $4 \text{ cm}$ .
5.  $936\sqrt{3} \text{ cm}^3$ .
6.  $228\sqrt{3} \text{ cm}^3$ .

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

- III. 1.** a) Dacă  $m(\sphericalangle A'AD) = 60^\circ \Rightarrow \Delta VAD$  este echilateral; dacă  $VM \perp AD \Rightarrow VM = 9\sqrt{6} \text{ cm}$  și  $VO = 18 \text{ cm} \Rightarrow A'D' = 6\sqrt{2} \text{ cm}$ ;
- b)  $a_{\text{tr}} = 6\sqrt{6} \text{ cm}$ ;
- c)  $\mathcal{A}_t = 576\sqrt{3} \text{ cm}^2$ ;  $\mathcal{V} = 3744 \text{ cm}^3$ ;
- d)  $\mathcal{A}_{\text{piramidă}} = 648\sqrt{3} \text{ cm}^2$ ;  $\mathcal{V}_{\text{piramidă}} = 3888 \text{ cm}^3$ .
- 2.** a)  $a_{\text{tr}} = 4\sqrt{3} \text{ cm}$ ;
- b)  $OO' = 3\sqrt{5} \text{ cm}$ ;
- c)  $\mathcal{V} = 171\sqrt{15} \text{ cm}^3$ ;
- d)  $\mathcal{A}_{\text{piramidă}} = 324\sqrt{3} \text{ cm}^2$ ;  $\mathcal{V}_{\text{piramidă}} = 243\sqrt{15} \text{ cm}^3$ .

## Test de autoevaluare – p. 127

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- I.** 1.  $208\pi \text{ cm}^2$ .  
2. 16 cm.  
3.  $1458\pi \text{ cm}^3$ .  
4.  $256\pi \text{ cm}^3$ .  
5. 9 cm.  
6.  $600\pi \text{ cm}^2$ .
- II.** 1. C. 2. D. 3. A. 4. B.
- III.** 1. a)  $R = 6 \text{ cm}$ ;  $G = 12 \text{ cm}$ ;  
b)  $432\pi \text{ cm}^3$ ;  
2. a)  $R = 18 \text{ cm}$ ;  $G = 30 \text{ cm}$ ;  $\mathcal{V} = 2592\pi \text{ cm}^3$ ;  $\mathcal{A} = 864\pi \text{ cm}^2$ ;  
b)  $216^\circ$ ;  
c) 14,06%.

## Test de autoevaluare – p. 133

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- I.** 1.  $G = 5 \text{ cm}$ .  
2.  $16 + 5\sqrt{7} \text{ cm}$ .  
3.  $576\sqrt{3}\pi \text{ cm}^3$ .  
4.  $1080\pi \text{ cm}^2$ .  
5. 10 cm.  
6. 9 cm.
- II.** 1. A. 2. B. 3. C. 4. D.
- III.** 1. a)  $\mathcal{A} = 144\pi \text{ cm}^2$ ;  $\mathcal{V} = 128\pi \text{ cm}^3$ ;  
b)  $\mathcal{A}_{\text{tr.}} = 140\pi \text{ cm}^2$ ;  $\mathcal{V} = 112\pi \text{ cm}^3$ .  
2. a)  $3536\pi \text{ cm}^2$ ;  $\mathcal{V} = 14976\pi \text{ cm}^3$ ;  
b)  $\mathcal{A} = 2000\pi \text{ cm}^2$ ;  $\mathcal{V} = 16000\pi \text{ cm}^3$ ;  
c)  $u^\circ = 288^\circ$ .