Mate 2000 Consolidare
Caiet de lucru. Clasa a VII-a, semestrul I, 2018-2019
TESTE DE AUTOEVALUARE
– SOLUȚII –

Test de autoevaluare – p. 44

I. **1.** $-\frac{2}{3}$.

2. 14.

3. $\frac{23}{13}$.

4. $x = \left\{-\frac{1}{2}, \frac{5}{2}\right\}$.

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

III. **1.** $4 - \left|1-\frac{x}{12}\right| = \frac{25}{100} \Leftrightarrow \left|1-\frac{x}{12}\right| = 4 - \frac{1}{4} \Leftrightarrow \left|\frac{x}{12}-1\right| = \frac{15}{4}$.

Avem $\frac{x}{12} - 1 = \frac{15}{4} \Leftrightarrow \frac{x}{12} = \frac{19}{4} \Leftrightarrow \frac{x}{3} = \frac{19}{1} \Leftrightarrow x = 57$. Avem $\frac{x}{12} - 1 = -\frac{15}{4} \Leftrightarrow \frac{x}{12} = -\frac{11}{4} \Leftrightarrow \frac{x}{3} = -\frac{11}{1} \Leftrightarrow x = -33$. În concluzie, $x \in \{-33, 57\}$.

2. Fie x prețul inițial al jocului. Prețul după prima reducere: $x - \frac{10}{100} \cdot x = x - \frac{x}{10} = \frac{9x}{10}$.

Prețul după a doua reducere: $\frac{9x}{10} - \frac{15}{100} \cdot \frac{9x}{10} = \frac{9x}{10} - \frac{3}{100} \cdot \frac{9x}{2} = \frac{9x}{10} - \frac{27x}{200} = \frac{180x - 27x}{200} = \frac{153x}{200}$. Formăm ecuația: $\frac{153x}{200} = \frac{11475}{100} \Leftrightarrow 153x = 22950 \Rightarrow x = 150$ lei.

Test de autoevaluare – p. 67

I. **1.** 2,9.
2. 15.
3. 13.
4. 23.

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

III. **1.** Se aplică: $1 + a + a^2 + ... + a^n = \frac{a^{n+1}-1}{a-1}$, $a \neq 1$;

$x = 1 + 4^1 + 4^2 + 4^3 + ... + 4^{125} = \frac{4^{126}-1}{3} \Rightarrow 3x + 1 = 4^{126} \Rightarrow \sqrt{3x+1} = 2^{126}$.

2. $\sqrt{13} = 3{,}6055... \Rightarrow$ produsul este egal cu 0.

3. a) $a_{12} = 5$; $a_{40} = 9$;

b) Putem lua pe n orice număr de forma: $1 + 3^1 + 3^2 + 3^3 + ... + 3^{2p-1}$; $p \in \mathbb{N}^* \Rightarrow 2n + 1 =$

$= 2 \cdot \frac{3^{2p}-1}{2} + 1 = 3^{2p} \Rightarrow \sqrt{2n+1} = 3^p \in \mathbb{Q}$.

Test de autoevaluare – p. 86

I. **1.** $21\sqrt{2}$.
2. –3.
3. 6.
4. 5.

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

III. **1.** Paranteza este egală cu: $\frac{23\sqrt{2}}{24} \Rightarrow \frac{23\sqrt{2}}{24} \cdot 16\sqrt{2} = \frac{92}{3}$.

2. $A = \frac{3+\sqrt{2}+\sqrt{3}+2\sqrt{2}+2\sqrt{3}}{1+\sqrt{2}+\sqrt{3}} = \frac{3+3\sqrt{2}+3\sqrt{3}}{1+\sqrt{2}+\sqrt{3}} = 3 \in \mathbb{N}$.

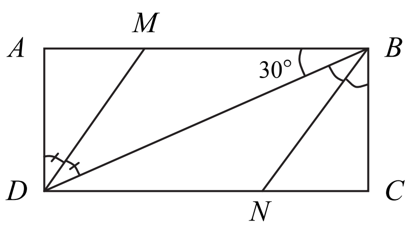
3. $AB = 4\sqrt{3}$; $AC = 5\sqrt{3}$; $BC = 8\sqrt{3}$. Deoarece $AB + AC > BC$, $AB + BC > AC$ şi $AC + BC > AB \Rightarrow A, B, C$ formează un triunghi.

Test de autoevaluare – p. 118

I. **1.** 150°.
2. 4 axe.
3. congruente.
4. înălţime.

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

III. **1.** În ΔABD cu m($\sphericalangle A$) = 90° şi m($\sphericalangle ABD$) = 30° $\Rightarrow$
$\Rightarrow$ m($\sphericalangle ADB$) = 60° şi, cum [DM bisectoarea $\sphericalangle ADB \Rightarrow$
$\Rightarrow$ m($\sphericalangle MDB$) = 30° (1). Analog, m($\sphericalangle NBD$) = 30° (2).
Din (1) şi (2) $\Rightarrow \sphericalangle MDB \equiv \sphericalangle NBD$ (alterne interne) $\Rightarrow$

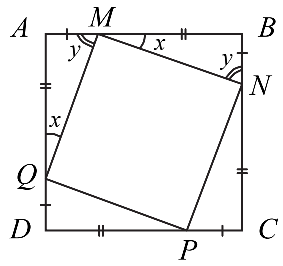


$\Rightarrow MD \parallel BN$. Din $MD \parallel BN$ şi $MB \parallel DN \Rightarrow DMBN$ – paralelogram (3).

Cum $m(\sphericalangle MDB) = m(\sphericalangle MBD) = 30^\circ \Rightarrow \Delta MBD$ isoscel de bază $[BD] \Rightarrow [MD] \equiv [MB]$ (4).

Din (3) şi (4) $\Rightarrow DMBN$ este romb.

2. Din congruenţa: $\Delta AMQ \equiv \Delta BNM \equiv \Delta CPN \equiv \Delta DQP$ (C.C.) $\Rightarrow$ $\Rightarrow [MN] \equiv [NP] \equiv [PQ] \equiv [QM] \Rightarrow MNPQ$ este un romb. De asemenea, $m(\sphericalangle BMN) = m(\sphericalangle AQM) = x$ şi $m(\sphericalangle AMQ) = m(\sphericalangle BNM) =$ $= y$. În ΔAMQ cu $m(\sphericalangle A) = 90^\circ \Rightarrow m(\sphericalangle AMQ) + m(\sphericalangle AQM) =$ $= 90^\circ \Leftrightarrow x + y = 90^\circ$ (1).



Avem: $m(\sphericalangle AMB) = m(\sphericalangle AMQ) + m(\sphericalangle QMN) + m(\sphericalangle BMN) \Leftrightarrow 180^\circ = y + m(\sphericalangle QMN) + x \overset{(1)}{\Leftrightarrow}$ $\Leftrightarrow 180^\circ = 90^\circ + m(\sphericalangle QMN) \Rightarrow m(\sphericalangle QMN) = 90^\circ$. Din $MNPQ$ romb şi $m(QMN) = 90^\circ \Rightarrow$ $\Rightarrow MNPQ$ pătrat.

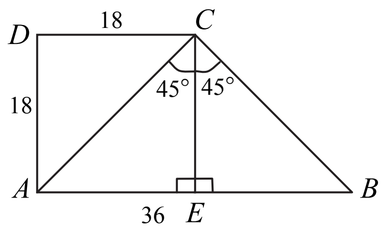
Test de autoevaluare – p. 130

I. **1.** 44 cm.
2. 27 cm^2.
3. 6 cm.
4. echivalente.

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

III. **1.** a) Fie $CE \perp AB$, $E \in (AB)$. Se obţine că $CE = BE = 18$ cm, de unde $DC = 18$ cm.

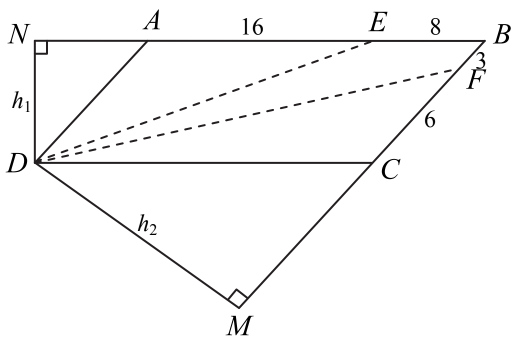
Atunci $\mathscr{A}_{ABCD} = \dfrac{(DC + AB) \cdot AD}{2} = 486$ cm^2.



b) Cum $AECD$ pătrat $\Rightarrow m(\sphericalangle ACE) = 45^\circ$ şi cum $m(\sphericalangle BCE) =$ $= 45^\circ \Rightarrow m(\sphericalangle ACB) = 90^\circ$, de unde $AC \perp BC$.

2. Din datele problemei obţinem că $AE =$ $= 16$ cm şi $BF = 3$ cm. Fie $DN \perp AB$, $DM \perp BC$, $N \in AB$ şi $M \in BC$.

Notăm $DN = h_1$, $DM = h_2$. Avem: $DN \cdot AB =$ $= DM \cdot BC \Leftrightarrow h_1 \cdot 24 = h_2 \cdot 9 \Leftrightarrow \dfrac{h_1}{h_2} = \dfrac{3}{8} \Rightarrow$ $\Rightarrow h_1 = 3k$ şi $h_2 = 8k$. Atunci: $\mathscr{A}_{\Delta ADE} =$ $= \dfrac{AD \cdot AE}{2} = \dfrac{h_1 \cdot 16}{2} = h_1 \cdot 8 = 3k \cdot 8 = 24k$ (1).



$\mathscr{A}_{\Delta DCF} = \dfrac{DM \cdot CF}{2} = \dfrac{h_2 \cdot 6}{2} = h_2 \cdot 3 = 8k \cdot 3 = 24k$ (2).

De asemenea $\mathscr{A}_{ABCD} = DN \cdot AB = h_1 \cdot 24 = 3k \cdot 24 = 72k$. Atunci $\mathscr{A}_{DEBF} = \mathscr{A}_{ABCD} - (\mathscr{A}_{\Delta ADE} +$ $+ \mathscr{A}_{\Delta DCF}) = 72k - (24k + 24k) = 24k$ (3). Din (1), (2) şi (3) $\Rightarrow \mathscr{A}_{\Delta ADE} = \mathscr{A}_{\Delta DCF} = \mathscr{A}_{DEBF}$.

Test de autoevaluare – p. 155

I. **1.** 35 cm.
2. 9 cm.
3. 6 cm.
4. 80°.

II. **1.** D.
2. A.
3. A.
4. D.

III. **1.** $AB + CD = 28$ cm şi $AB - CD = 6$ cm $\Rightarrow 2 \cdot AB = 34$ cm $\Rightarrow AB = 17$ cm $\Rightarrow CD = 11$ cm.
Atunci $\mathscr{P}_{ABCD} = 11 \cdot 3 + 17 = 50$ cm.

2. Avem $[AD]$, $[BE]$ mediane şi $\{G\} = AD \cap BE \Rightarrow G$ este centrul de greutate în $\Delta ABC \Rightarrow \frac{DG}{AD} = \frac{1}{3}$. Cum $\frac{DM}{DC} = \frac{1}{3}$, obţinem că $\frac{DG}{DA} = \frac{DM}{DC} \overset{\text{R.T.Th}}{\Rightarrow} GM \parallel AC$.