A

Subiecte Clasa a VII-a

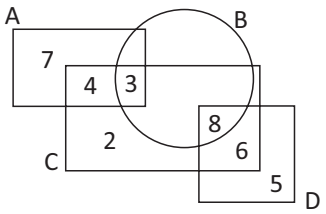
(40 de intrebari)

- Puteti folosi spatiile goale ca ciorna.
- Nu este de ajuns sa alegeti raspunsul corect pe brosura de subiecte, ele trebuie completate pe foaia de raspuns in dreptul numarului intrebarii respective.

1. A si B sunt doua multimi, iar card(A)=8 si card(B)=11. Aflati diferenta dintre valoarea maxima si valoarea minima a card(AUB) .

A) 3 B) 5 C) 7 D) 8 E) 9

2. Privind figura alaturata, care din urmatoarele este gresita?



A) $A \cap (B \cup D) = \{3\}$
B) $A \cap D = \varnothing$
C) $A \not\subset D$
D) $(A \cup B) \cap C = \{3,4\}$
E) $B \setminus (A \cup D) = \varnothing$

3. Fie
$A=\{-10; -5,2; -\sqrt{3}; -\frac{1}{2}; 0; \sqrt{2}; 1,(7); 3\sqrt{5}; 10\}$.

Aflati elementele multimii: $(A \cap \mathbb{Z}^*) \cup (A\setminus\mathbb{Q})$.

A) $\{-10; 10\}$
B) $\{ -\sqrt{3}; \sqrt{2}; 3\sqrt{5} \}$
C) $\{ -5,2; -\frac{1}{2}; 1,(7) \}$
D) $\{ -10; -5,2; -\frac{1}{2}; 1,(7); 10 \}$
E) $\{-10; -\sqrt{3}; \sqrt{2}; 3\sqrt{5}; 10\}$

4. $-4^2 + (-4)^2 \cdot (-2)^3 + 7^0 =?$

A) 145 B) 151 C) 113 D) -111 E) -143

5. Pentru a incarca la capacitate maxima un camion este nevoie de 7 frigidere si 15 cuptoare cu microunde sau 13 frigidere si 6 cuptoare cu microunde. Daca scoatem 6 cuptoare cu microunde, cate frigidere este necesar sa asezam in loc?

A) 2 B) 4 C) 5 D) 8 E) 9

6. Multimea $A = \{x \in \mathbb{Z} \mid 7 < x^2 \leq a\}$ are 12 elemente. Cate valori naturale poate lua a?

A) 8 B) oricate, $a \geq 64$ C) 17 D) 18 E) 64

7. $\left[\dfrac{(7 + 14 + 21 + ... + 147)^2}{(14 + 28 + 42 + ... + 294)^2}\right]^{-1} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $-\frac{1}{2}$ D) 2 E) 4

8. Calculand [3,(1) + 6] : [1,(5) + 3] obtinem:

A) $\frac{1}{5}$ B) $\frac{5}{9}$ C) $\frac{1}{2}$ D) 1 E) 2

9. Solutia in $\mathbb{Q}^*$ a ecuatiei: $\dfrac{0{,}32 \cdot x + 18}{x} = 0{,}82$ este:

A) 5 B) 36 C) 60 D) 50 E) 80

10. $\dfrac{0{,}19}{0{,}0019} - \dfrac{0{,}5}{0{,}025} - \dfrac{0{,}1}{0{,}0008} = ?$

A) –95 B) –45 C) 715 D) 875 E) 975

11. La Liceul International de Informatica 99% din totalul de 100 de elevi ai liceului au media la matematica peste opt si 98% din elevii care stau la internatul liceului au media la matematica peste opt. Cati elevi nu stau in internat?

A) 1 B) 2 C) 49 D) 50 E)98

12. Sa se determine valoarea maxima a numarului natural a, diferit de 0, pentru care:

$$\frac{1}{3+6} + \frac{1}{3+6+9} + \frac{1}{3+6+9+12} + \cdots + \frac{1}{3+6+9+12+\cdots+2010} < \frac{1}{a}$$

A) 5 B) 3 C) 4 D) 6 E) 7

13. Gasiti $a \in \mathbb{Q}$ astfel incat $\frac{x+a}{y+a} = \frac{x^2}{y^2}$ unde $x \neq \pm y$.

A) $\frac{xy}{x+y}$ B) $\frac{x+y}{xy}$ C) $\frac{xy}{x-y}$ D) $\frac{x-y}{xy}$ E) $\frac{-xy}{x+y}$

14. Daca numerele $(x-1)^3$ si 27 sunt direct proportionale cu 3 si $x-1$, gasiti valoarea pozitiva a expresiei $(x-1)^5$.

A) 81 B) 27 C) 4^5 D) 243 E) 3^6

15. Produsul dintre media geometrica si media aritmetica a numerelor $4-\sqrt{15}$ si $4+\sqrt{15}$ este:

A) $\sqrt{15}$ B) 4 C) $4+\sqrt{15}$ D) $4-\sqrt{15}$ E) 0

16. Suma a patru numere intregi strict pozitive, diferite doua cate doua, este 320. Care este valoarea maxima pe care o poate lua cel mai mic dintre ele?

A) 80 B) 1 C) 82 D) 314 E) 78

17. Daca $-1 < a < b < 0$ stabiliti cate din urmatoarele relatii sunt adevarate:

i) $a^2 > b^2$

ii) $\frac{a}{b} < a$

iii) $a^3 < b^3$

iv) $a \cdot b > b^2$

v) $2a > a + b$

A) 1 B) 2 C) 3 D) 4 E) 5

18. Cate dintre numerele $\sqrt{1}, \sqrt{2}, \sqrt{3}, \ldots, \sqrt{2008}$ sunt rationale?

A) 2008 B) 43 C) 44 D) 45 E) 25

19. Suma solutiilor ecuatiei $|x-1| = \left|-\frac{1}{2}\right|$ este:

A) -2 B) -1 C) 0 D) 1 E) 2

20. Fie $A = \sqrt{1\cdot 2} + \sqrt{2\cdot 3} + \sqrt{3\cdot 4} + \cdots + \sqrt{30\cdot 31}$ si $B = \sqrt{5\cdot 6} + \sqrt{10\cdot 9} + \sqrt{15\cdot 12} + \cdots + \sqrt{150\cdot 93}$, aflati $\frac{B}{A}$.

A) $\sqrt{5}$ B) $\sqrt{3}$ C) $\sqrt{8}$ D) $\sqrt{15}$ E) $\sqrt{6}$

21. Valoarea expresiei:

$$\frac{1}{2\sqrt{1}+1\sqrt{2}}+\frac{1}{3\sqrt{2}+2\sqrt{3}}+\frac{1}{4\sqrt{3}+3\sqrt{4}}+\frac{1}{5\sqrt{4}+4\sqrt{5}}+\dots+\frac{1}{9\sqrt{8}+8\sqrt{9}}$$

este:

A) $\frac{1}{2}$ B) $\frac{\sqrt{2}}{3}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{3}{2}$ E) $\frac{2}{3}$

22. Calculand suma:

$$\frac{\sqrt{2}-\sqrt{3}}{\sqrt{6}}+\frac{\sqrt{3}-\sqrt{4}}{\sqrt{12}}+\frac{\sqrt{4}-\sqrt{5}}{\sqrt{4\cdot 5}}+\dots+\frac{\sqrt{n}-\sqrt{n+1}}{\sqrt{n\cdot(n+1)}},$$

$n \in \mathbb{N}^*$ obtinem:

A) $\frac{1}{\sqrt{2(n+1)}}$ B) $\sqrt{n+1}-\frac{1}{\sqrt{2}}$ C) $\sqrt{2}-\frac{1}{\sqrt{n+1}}$

D) $\frac{1}{\sqrt{n+1}}-\frac{1}{\sqrt{2}}$ E) $\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{n+1}}$

23. Daca numarul natural n este patrat perfect, precizati care din urmatoarele numere nu poate fi niciodata patrat perfect.

A) n-1 B) n-2 C) n-3 D) n-4 E) n-5

24. Aflati media aritmetica a numerelor a si $b \in \mathbb{Q}$ astfel incat $\frac{a}{\sqrt{3-2\sqrt{2}}}-\frac{b}{\sqrt{3+2\sqrt{2}}}=\sqrt{2}$.

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) 0 D) 1 E) $\frac{1}{4}$

25. Daca $a^5 \cdot b^2 > 0$, $b^3 \cdot c^5 > 0$ si $a^3 \cdot c^3 < 0$, aflati semnele lui a, b si c.

A) a>0; b>0; c<0 B) a>0; b<0; c<0

C) a<0; b<0; c<0 D) a>0; b<0; c>0

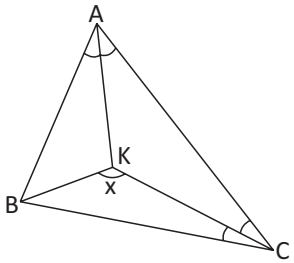
E) a<0; b>0; c<0

26. Stabiliti cate din urmatoarele relatii sunt adevarate:

i) $(a + b)^2 = a^2 + b^2 + 2ab$
ii) $a^2 - b^2 = (a - b)(a + b)$
iii) $(a - b)^2 = (a + b)^2 - 4ab$
iv) $a^2 + b^2 = (a - b)^2 + 4ab$

A) 1 B) 2 C) 3 D) 4 E) 0

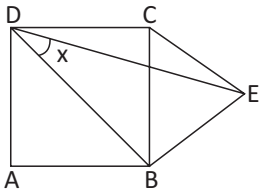
27. Pentru triunghiul ABC, AK si CK sunt bisectoare. Daca m(∡BAK)=m(∡CAK)=23° si m(∡ACK)=m(∡BCK)=15° aflati m(∡BKC).



A) 103° B) 107° C) 110°

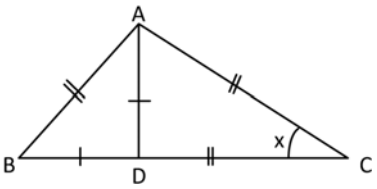
D) 112° E) 113°

28. In figura, ABCD este un patrat si ECB este un triunghi echilateral. Aflati m(∡EDB) = x



A) 25° B) 30° C) 32° D) 36° E) 40°

29. In triunghiul ABC, AB=AC=CD si BD=AD. Aflati m(∡ACD)=x.



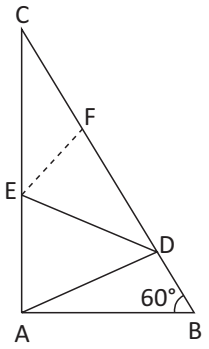
A) 9° B) 18° C) 27° D) 36° E) 45°

30. Fie D un punct pe latura (AC) a ΔABC cu AB>BC. Stabiliti ce relatie exista intre AB si BD.

A) AB<BD B) AB>BD C) 2AB=BD

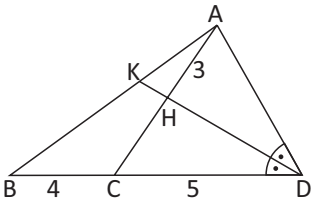
D) $\frac{AB}{BD} = \frac{1}{3}$ E) AB=BD

31. Fie triunghiul dreptunghic ABC, m(∡A) = 90°, m(∡B) = 60°, AD ⊥ BC, D ∈ (BC), DE este mediana in triunghiul ADC, E ∈ (AC) si (EF bisectoare in triunghiul EDC, F ∈ (BC). Calculati raportul lungimilor segmentelor EF si AC.



A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{2}{3}$ D) $\frac{1}{3}$ E) $\frac{3}{4}$

32. In triunghiul ABD, DK este bisectoarea ∡ADB, DH ⊥ AC, BC=4, CD=5 si AH=3. Aflati $A_{\Delta AKH}$.



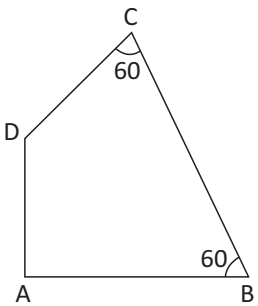
A) $\frac{4}{3}$ B) $\frac{7}{2}$ C) $\frac{9}{5}$ D) $\frac{8}{5}$ E) $\frac{12}{7}$

33. In triunghiul dreptunghic ABC, m(∡A) = 90°, m(∡C) = 15°, se duc inaltimea AD, mediana AO si bisectoarea AE (D, E, O ∈ BC) . Precizati relatia corecta.

A) [OD] ≡ [DA] B) 2·AE = 3·EO C) EO = 2·ED

D) [CE] ≡ [EB] E) [OE] ≡ [ED]

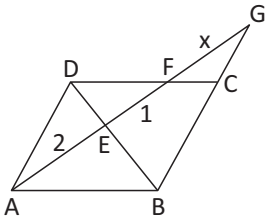
34. In figura, m(∡B) = m(∡C) = 60°, AD ⊥ AB si BC+CD=15 cm. Aflati AB.



A) 4,5 cm B) 5 cm C) 6 cm

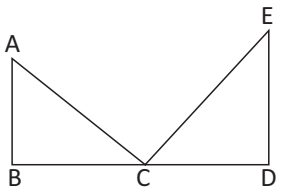
D) 7,5 cm E) 9 cm

35. In figura alaturata ABCD este paralelogram. Daca AE=2 si EF=1, aflati GF.



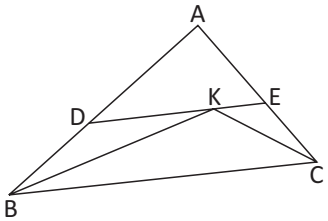
A) 2 B) 3 C) 4 D) 5 E) 6

36. In figura alaturata $AB \perp BD$; $AC \perp EC$; $AB \parallel ED$; $BD = 2BC$ si $AB \cdot ED = 54$. Aflati CD.



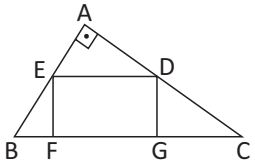
A) $3\sqrt{6}$ B) $4\sqrt{3}$ C) $4\sqrt{2}$ D) $2\sqrt{6}$ E) $3\sqrt{2}$

37. In ΔABC, BK si CK sunt bisectoare. Daca $DE \parallel BC$, AD=12 cm, BD=6 cm si AE=8 cm. Cati cm are BC?



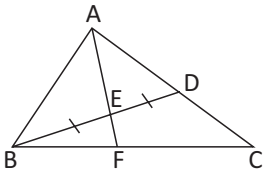
A) 12 B) 15 C) 18 D) 20 E) 24

38. ABC este un triunghi dreptunghic cu $m(\measuredangle A) = 90°$ si DEFG este un dreptunghi. Daca BF=4 si CG=9 aflati DG.



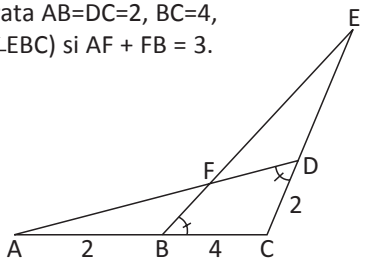
A) 2 B) 3 C) 4 D)6 E) 8

39. In figura alaturata BE=ED, 2AD=3DC si BF=6. Aflati FC.



A) 4 B)6 C) 8 D) 9 E) 10

40. In figura alaturata AB=DC=2, BC=4, $m(\measuredangle ADC)=m(\measuredangle EBC)$ si AF + FB = 3. Aflati $P_{\Delta FED}$.



A) 21 B) 25 C) 22 D) 24 E) 27