**EVALUARE NAŢIONALĂ PENTRU ABSOLVENŢII CLASEI a VIII-a**

**Anul şcolar 2020 – 2021**

**Matematică**

***Model propus de Prof.* Manu Adrian**

***C.N. GRIGORE MOISIL, BUCUREȘTI***

* **Toate subiectele sunt obligatorii.**
* **Se acordă 10 puncte din oficiu.**
* **Timpul de lucru efectiv este de 2 ore**

**SUBIECTUL I**

***Încercuieşte litera corespunzătoare răspunsului corect.* (30 de puncte)**

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| **5p** | **1.** Rezultatul calculului: 24:(-3)+ (-9) este: a) 17  b) -1 c) -17 d) 9 |
| **5p** | **2.** A 2021-a zecimală a numărului 39,14(726) este: a) 2  b) 1 c) 7 d) 6 |
| **5p** | **3.** Într-un sertar sunt 40 de cartoane albe , 50 cartoane verzi și 10 de cartoane roșii. Probabilitatea ca, extrăgând un carton, aceasta să fie alb sau verde este: a) 3/10 b) 4/10 c) 9/10 d) 1/10 |
| **5p** | **4.** Fie funcţia f: R →R , f(x)=3x -5 . Dacă punctul M(2m-1; 7m )∈G***f*** atunci m este egal cu: a) -1  b)- 5  c) -7  d) -8 |
| **5p** | **5.** Mulţimea M={x∈R /-5$\leq $ 2x-1< 7} este egală cu: a) [-2,4)  b) (-2,4)  c) [-2,4]  d){-2,-1,0,1,2,3}  |
| **5p** | **6.** Având de calculat raportul dintre dublul lui 3 adunat cu 1 și inversul lui 7 . Ionel afirmă că raportul este 1. Afirmaţia pe care o face Ionel este: a) adevărată b) falsă |

**SUBIECTUL al II**

***Încercuieşte litera corespunzătoare răspunsului corect.* (30 de puncte)**

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| **5p** | **1.**Fie AOB,  BOC,  COD şi  DOA patru unghiuri în jurul punctului O, având măsurile impare consecutive. Măsura unghiului MON unde [OM este bisectoarea AOB iar [ON este bisectoarea BOC este a) 88o b) 90o  c) 89o   d) 87o |
| **5p** | **2.** Fie triunghiul ABC cu AB = 12 cm, AC = 16 cm şi BC = 20 cm. Înălțimea dusă din vârful A al triunghiului ABC are lungimea de:1. 9,6 cm
2. 2,5 cm
3. 13 cm
4. 5,4 cm

   |
| **5p** | **3.** Avem triunghiul ∆ABC echilateral , cu lungimea laturii AB=5 cm și D simetricul lui C față de B. Fie $BB^{'}$bisectoarea unghiului ≮DBA, $B^{'}\in (AD)$.Măsura unghiului ≮D$B^{'}$B este de: a) 30o  b) 90o  c) 75o   d) 60o |
| **5p** |  **4.** Aria unui pătrat cu diagonala de 8cm este de:a) 10 cm2b) 20cm2 c) 40 cm2d) 32cm2 |
| 5p | **5.**Fie cercul ***C***(O,R), şi M,N două puncte pe el. Dacă $\hat{MON}$= 120° şi MN= 8$\sqrt{3}$ cm, atunci lungimea cercului este egală cu:1. 8π cm
2. 16π cm
3. 8$\sqrt{3}$ π cm
4. 10π cm
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| 5p | **6.**  Se dă piramida patrulateră regulată VABCD .Ea are înălțimea de lungime 6 cm şi aria bazei de 144cm2.Distanţa de la punctul A la fața laterală (VBC) are lungimea de:a)12 cmb)6 cm c) 6$\sqrt{3}$cm cm d) 6$\sqrt{2}$cm   |

**SUBIECTUL AL III-lea**

***Scrieţi rezolvările complete.* (30 de puncte)**

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| **5p** | **1.** Elevii unei clase dacă s-ar așeza câte trei în bancă , ar rămâne trei bănci libere, iar dacă s-ar așeza câte doi, ar rămâne cinci elevi în picioare.**(2p) a)** Verificaţi dacă pot fi 29 de elevi .

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**(3p) b)** Aflați numărul de elevi ai clasei.

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| **5p** | **2.** Fie funcția f: R →R , f(x)= 9x-6**(2p) a)** Aflați punctul de pe graficul funcției f care are ordonata egală cu triplul abscisei.

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**(3p) b)** Calculaţi distanţa de la punctul de intersecție al graficului funcției cu axa ordonatelor a sistemului de coordonate xOy și punctul B(2,4).

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 |
| **5p** | **3.** Fie expresia E(x)=$ (x+2\sqrt{2})(x-2\sqrt{2}))-2\left(x-3\right)\left(x+5\right)+\left(x+3\right)^{2}-28$ **(2p) a)** Arătați căE(x)=2x+3

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**(3p) b)** Demonstrați că numărul N=$\sqrt{E\left(1\right)+E\left(2\right)+…+E\left(n\right)+4}$este natural oricare ar fi numărul natural nenul n.

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| **5p** |  **4.** Fie ∆ABC dreptunghic în A, latura AC=8cm și latura BC=10cm.Se duce BD bisectoarea unghiului B,D∈(AC) .Fie DMBC, M∈(BC).**(2p) a)** Calculaţi lungimea lui AD

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**(3p) b)** Calculați aria triunghiului DMC.

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| **5p** | **5.** Fie ABCD este trapez dreptunghic , AB// CD şi AB < CD , m($≮$A) = m($≮$D) =90.Înălțimea sa este de 8cm,iar tg C=$\frac{4}{3}$.Știm că AB =BC.**(2p) a)** Aflaţi perimetrul și aria trapezului

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**(3p) b)** Calculaţi distanţa de la punctul A la BD .

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 |
| **5p** | **6.** VABC este o piramidă triunghiulară regulată cu AB= 12cm şi înălțimea VO = 2$\sqrt{6}$cm . **(3p)** **a)** Aflați unghiul făcut de latura bazei BC cu muchia laterală VA.

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**(2p)b)** Aflați distanța de la punctul T la planul ( VAC ), unde T este mijlocul laturii BC.

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**EVALUARE NAŢIONALĂ PENTRU ABSOLVENŢII CLASEI aVIII-a**

**Anul şcolar 2020-2021**

**Matematică**

**BAREM DE EVALUARE ŞI DE NOTARE**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** |
| **Subiectul I (30p)** | **c** | **d** | **c** | **d** | **a** | **b** |
| **Subiectul II (30p)** | **a** | **a** | **b** | **d** | **b** | **d** |

**SUBIECTUL al III-lea (30 de puncte)**

|  |  |  |
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| **1.** | **a)** 3(y-3)=29Nu pot fi 29 de elevi, deoarece 29 nu se divide cu 3. |  **1p** **1p** |
| **b)** Fie x= nr. elevilor și y= nr. băncilorx=3(y-3), x=2y+53y-9=2y+5, y=14 bănci.Rezolvarea sistemului: x=33 elevi .$\frac{3}{11}$$\frac{27}{99}$$€ \{ 1, 2 ,3,,…,20\}$ |  **1p** **2p** |
| **2.** | **a)** a)Fie M(x,y) , iar y=3x9x-6=3x6x=6x=1, iar y=3Deci M(1,3). |  **1p****1p** |
| **b)** Punctul de intersecție al graficului funcției cu axa ordonatelor a sistemului de coordonate xOy are coordontele A(0,-6).Lungimea lui AB este$ \sqrt{(2-0)^{2}+(4+6)^{2}}$=2$\sqrt{26}$ . |  **1p** **2p**  |
| **3.** | **a)** Rezolvarea expresieiE(x)=2x+3 | **1p** **1p** |
| **b)** N=$\sqrt{2\left(1+2+..+n\right)+3n+4}$=$\sqrt{n^{2}+4n+4}$ =n+2 , care este număr natural. |  **1p** **2p**  |
| **4.** | **a)** În ∆ABC dreptunghic, cu ajutorul teoremei lui Pitagora obținem AB=6cmÎn ∆ABC, cu ajutorul teoremei bisectoarei obținem$\frac{AD}{DC}=\frac{AB}{BC}$, AD=3cm |  **1p** **1p** |
| **b)** DC=5cm∆CMD~ ∆CAB (U.U)$\frac{DM}{AB}=\frac{DC}{BC}=\frac{MC}{AC}$, DM=3cm și MC=4cmAria triunghiului DMC=6$cm^{2}$ . |  **3p** |
| **5.** | **a)** Ducem înălțimea BM a trapezului ABCDtg C$=\frac{BM}{MC}$MC=6 cmBC=10cmDeci AB=10cmAB=DM=10cmBM=AD=8cmDC=DM+MC=16cm$P\_{ABCD}$= 44cm$A\_{ABCD}=104cm^{2}$. |  **1p** **1p** |
| **b)** BD =$\sqrt{164}$ cm = $2\sqrt{41}$Ducem AP perpendiculară pe BDAP =$\frac{c\_{1 ∙ }c\_{2}}{ip}$ =$\frac{8∙10}{2\sqrt{41}}$ = $\frac{40\sqrt{41}}{41}$ cm. |  **2p** **1p** |
| **6.** | **a)** Fie T mijlocul lui BC, atunci AT⊥BC și VT⊥BC, deci BC⊥(VAT)Atunci BC⊥VA, deci unghiul făcut de ele este de 90o .  |  **1p** **1p** |
| **b)** Fie TP de la punctul T la planul ( VAC ).$V\_{VATC}$=$\frac{A\_{b}∙h}{3}$ =$\frac{A\_{ATC}∙VO}{3}=\frac{A\_{VAC}∙TP}{3}$TP=3$\sqrt{2}$ cm |  **2p** **1p** |