



Türkiye Matematik Yarışması

9. SINIF

TMY - 230409



AD SOYAD :

OKUL ADI :

SINIF :

www.turkiyematematikyarismasi.com

TMY 2023 1.ASAMA YANIT ANAHTARI

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
3.SINIF	B	C	C	C	D	D	E	E	B	B	B	D	A	D	D	E	C	C	B	D								
4.SINIF	C	E	B	D	D	C	B	D	B	D	D	ipt.	C	E	D	C	C	A	C	C								
5.SINIF	A	C	E	A	C	E	C	C	C	B	E	E	A	E	C	C	D	D	ipt.	A	B	B	D	C				
6.SINIF	D	A	D	C	B	C	B	E	D	C	D	B	E	C	A	B	E	A	D	C	A	D	D	C				
7.SINIF	C	B	D	A	E	A	E	B	B	E	E	D	A	C	D	A	D	E	D	A	D	D	D	E				
8.SINIF	D	B	D	D	B	C	D	D	A	B	D	C	C	E	C	B	D	D	E	B	D	D	D	E				
9.SINIF	E	A	A	E	B	C	A	B	C	C	A	B	B	A	B	C	C	D	E	C	C	D	B	C	D	D	A	B
10.SINIF	E	B	B	C	B	A	B	D	E	B	A	D	A	C	E	D	D	D	B	D	E	E	C	D	D	D	B	D
11.SINIF	D	A	B	E	A	C	C	B	A	D	A	D	C	E	B	C	D	A	B	D	D	A	C	B	D	D	B	B

(4)	Salı 1	Salı 8	Salı 15	Salı 22	Salı 29
	2	9	16	23	30 - Çarşamba
	3	,	.	24	
	4	,	.	25	
	5	,	.	26	
	6			27 - Pazar	
	7	14	20 21	28 - Pazartesi	

Salı, Pazartesten fazla olduğuna göre aynı günün Salıdır.

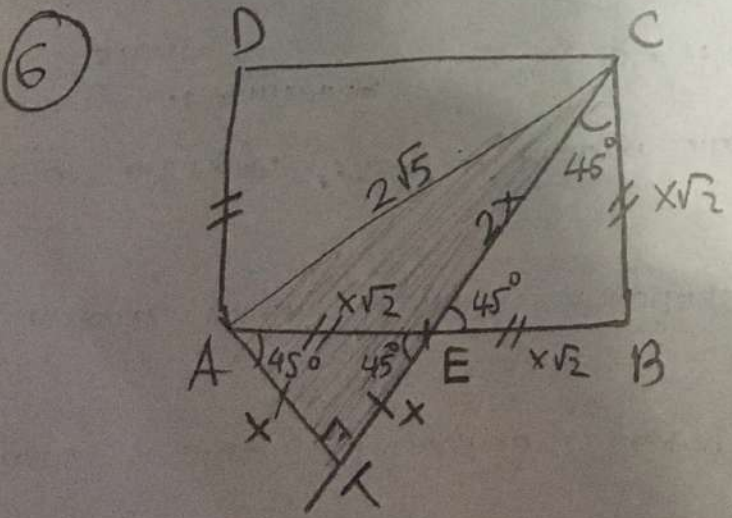
Yanıt: 20. gün PAZAR E şikr.

(5) $A = \{ 2, 3, 5, 6, 8, 10, 12, 15 \}$

$\begin{matrix} \uparrow & \uparrow & \uparrow \\ 2^3 & 2^2 \cdot 3 & 3 \cdot 5 \\ \parallel & \downarrow & \downarrow \\ 2 \cdot 3 & 2 \cdot 5 & 3 \cdot 5 \end{matrix}$

Her bir çarpımda = $2^5 \cdot 3^3 \cdot 5^2$ vardır.
(2, 3, 5 in en büyük kuvvetleri)

\Rightarrow ehob = $32 \cdot 27 \cdot 25 = 21600$ Yanıt B



$\triangle AEC$ de Pisagor
 $x^2 + (3x)^2 = (2\sqrt{5})^2$
 $10x^2 = 20$
 $x^2 = 2$
 $A(\triangle AEC) = \frac{1}{2} \cdot x \cdot 3x = \frac{3x^2}{2} = 3$
Yanıt C

7) $A = \{1, 2, 3, \dots, 49, 50\}$.

1 → 3, 5, ..., 49 ⇒ (1, b) ikili sayısı = $\frac{49-3}{2} + 1 = 24$
 3 → 5, ..., 49 ⇒ (3, b) " = $\frac{49-5}{2} + 1 = 23$.

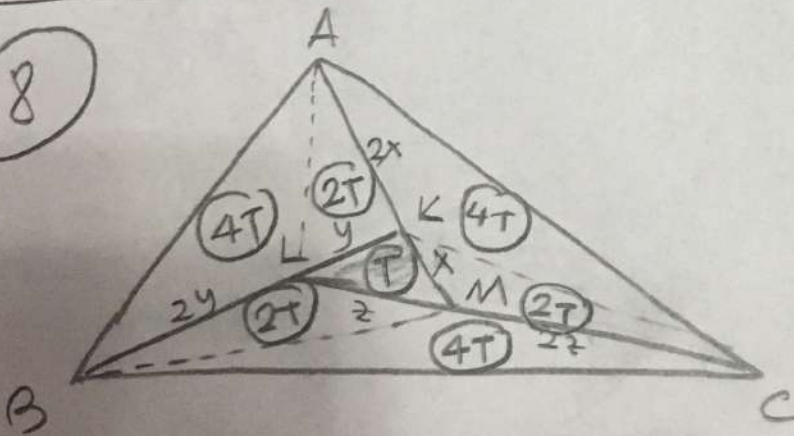
47 → 49 ⇒ (47, b) ikili sayısı = 1 tane

2 → 4, 6, 8, ..., 50 ⇒ (2, b) ikili sayısı = $\frac{50-4}{2} + 1 = 24$
 ⋮

48 → 50 ⇒ (48, b) ikili sayısı = 1.

Toplam ikili sayısı = $2(1+2+\dots+24) = 24 \cdot 25 = 600$
 Yanıt A 7.

8



$A(A \hat{B} C) = 19T$
 $= 19 \cdot 6$
 $= 114$
 Yanıt B

9

$A = \{1, 2, 3, 4\}$, $C = \{1, 2, 3, 5, 6, 7\}$

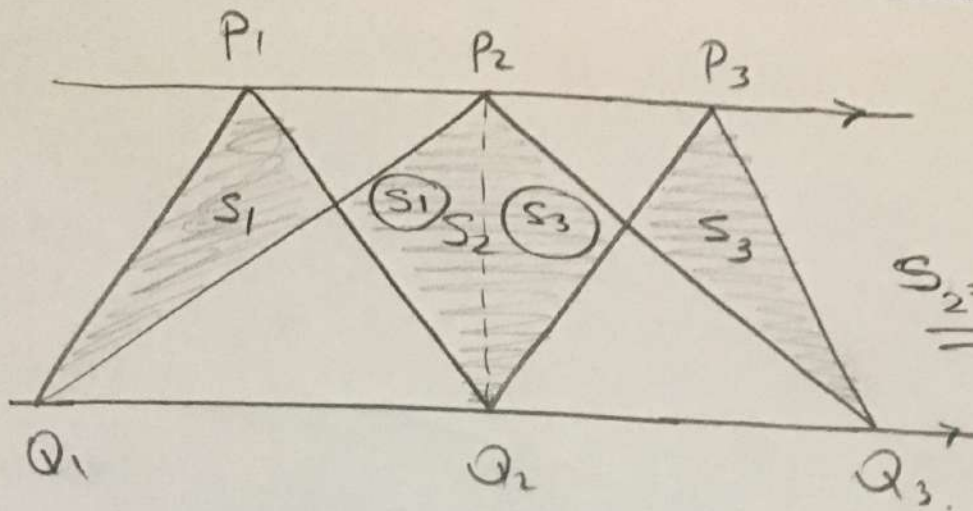
$B \subset C$; $s(A \cap B) = 2$

B de 1, 2, 3 ten 2 tane olmak ⇒ $\binom{3}{2} = 3$

5, 6, 7 nin tüm olası durumları ($2^3 = 8$) B'ye yerleştir.

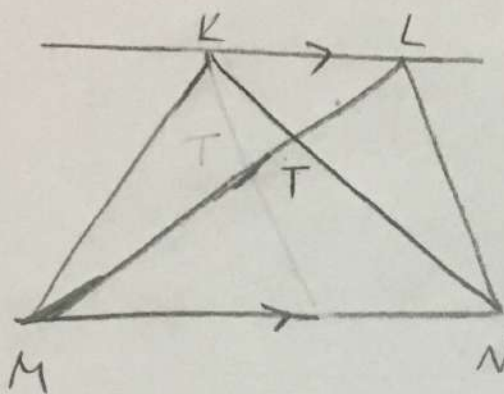
Yanıt = $3 \cdot 8 = 24$ (C sikli)

10



$$\underline{\underline{S_2 = S_1 + S_3}}$$

Yamit C



$$\Delta T L K \sim \Delta T M N$$

$$\Rightarrow \frac{TL}{TM} = \frac{TK}{TN} = \frac{LK}{MN}$$

$$\Rightarrow \frac{A(\Delta T L K)}{A(\Delta T M N)} = \frac{A(\Delta T L K)}{A(\Delta T L M)} = \frac{A(\Delta T L K)}{A(\Delta T M N)}$$

$$\Rightarrow A(\Delta M T K) = A(\Delta T N L) = A(\Delta M N T)$$

11

$$\frac{2^m \cdot q^n}{2} = (m+1)(n+1), \quad (q \neq 2 \text{ asal})$$

$$\Rightarrow 2^{m-1} \cdot q^n = (m+1)(n+1)$$

$$2^2 \cdot 3^1 = (3+1)(1+1) \checkmark$$

En büyük TMY $12 \rightarrow 1+2=3$ Yamit A

12

$$11^1 = 11 \rightarrow 2 = 2^1$$

$$11^2 = 121 \rightarrow 4 = 2^2$$

$$11^3 = 1331 \rightarrow 8 = 2^3$$

$$11^4 = 14641 \rightarrow 16 = 2^4$$

4 tane n var

Yanıt B

$$(10+1)^n = \binom{n}{0}10^n + \binom{n}{1}10^{n-1} + \dots + \binom{n}{n-1}10 + 1$$

$n \geq 5$ için bazı $m \in \mathbb{Z}$ için $\binom{n}{m} \geq 10$ (2 basamaklı)

13

$$x^3 - x^2 + x - 1 = x^2(x-1) + (x-1) = (x-1)(x^2+1)$$

$x=2$: $1 \cdot 5 = 5$ asal.

$x \geq 3$ için $(x-1)(x^2+1)$ asal değildir.

1 tane x var

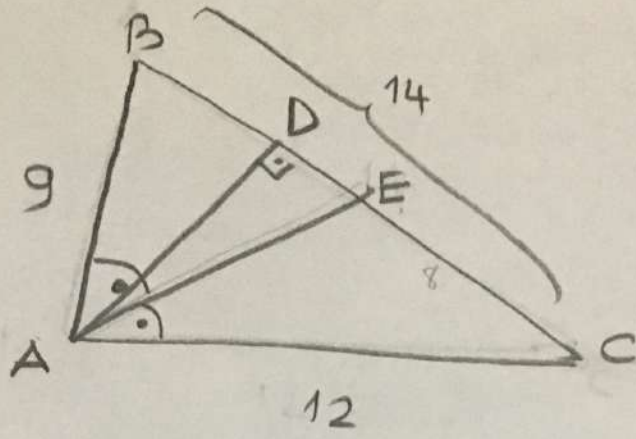
Yanıt: B

14 $(\sqrt{x-5} + \sqrt{y-3} = \sqrt{x+y})^2$

$$\Rightarrow \cancel{x-5} + \cancel{y-3} + 2\sqrt{(x-5)(y-3)} = \cancel{x+y}$$

$$\Rightarrow \begin{matrix} (x-5)(y-3) = 16 \\ 1 \quad 16 \\ 4 \quad 4 \end{matrix} \left. \vphantom{\begin{matrix} (x-5)(y-3) = 16 \\ 1 \quad 16 \\ 4 \quad 4 \end{matrix}} \right\} x=6, y=9 \Rightarrow xy = \underline{54} \quad \text{A}$$

15



Açıortay teoreminde

$$BE = 3k, EC = 4k$$

$$\Rightarrow 7k = 14 \quad k = 2$$

$$\Rightarrow BE = 6, EC = 8$$

$$AE^2 = 9 \cdot 12 - 8 \cdot 6$$

$$AE = 2\sqrt{5}$$

ABC nin alanından: $\frac{AD \cdot 14}{2} = \sqrt{\frac{35}{2} \cdot \frac{11}{2} \cdot \frac{17}{2} \cdot \frac{7}{2}}$

$$\Rightarrow AD \cdot 14 = \frac{7}{2} \sqrt{55 \cdot 17} \Rightarrow AD = \frac{\sqrt{55 \cdot 17}}{4}$$

ADE de pisagor: $(2\sqrt{5})^2 = \left(\frac{\sqrt{55 \cdot 17}}{4}\right)^2 + (DE)^2$

$$\Rightarrow DE^2 = 60 - \frac{55 \cdot 17}{16} = \frac{25}{16} \Rightarrow DE = \frac{5}{4} \quad \underline{\text{Yanıt B}}$$

16

$$ABC - CBA = 99(A - C) = 450 \Rightarrow \text{Üç basamaklı yoktur}$$

$$ABCD - DCBA = 999A + 90B - 90C - 999C = 450$$

$$\Rightarrow 999(A - D) + 90(B - C) = 450$$

$$\Rightarrow 111(A - D) + 10(B - C) = 50$$

A-D=0 olmaz

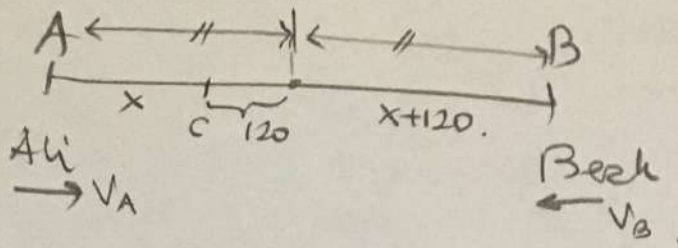
$$B - C = 5 \Rightarrow$$

$$\begin{matrix} ABCD \\ 1051 \end{matrix}$$

$$1 + 5 + 1 = 7$$

Yanıt C

17



C de karsilasma: $\frac{x+240}{v_B} = \frac{x}{v_A}$ saat sonra dur. (1)

$x = \frac{25}{9} v_B$, $x+240 = 9v_A$. $\Rightarrow \frac{v_A}{v_B} = \frac{\frac{x+240}{9}}{\frac{9x}{25}} = \frac{x+240}{81x} \cdot 25$ (2)

(1)+(2) $\Rightarrow \frac{x+240}{81x} \cdot 25 = \frac{x}{x+240}$

$\Rightarrow (5(x+240))^2 = (9x)^2$

$\Rightarrow 5(x+240) = 9x$

$\Rightarrow 5 \cdot 240 = 4x$

$300 = x$

$|AB| = (420) \cdot 2 = 840$

Yanit C

18

ehob $(A, B) = 8 \Rightarrow A = 8k, B = 8m, \text{ehob}(k, m) = 1$

$A+B=104 \Rightarrow k+m=13$. ($k < m$)

$(k, m) = (1, 12), (2, 11), (3, 10), (4, 9), (5, 8), (6, 7)$

6 tane Yanit: D

19

$a-b = 3 \cdot 5^{\frac{a+b}{3}} = 5 \cdot 3^{a+b} \Rightarrow a+b=3$

$a-b = 27 \cdot 5 = 135$

$a+b = 3$

\pm

$a = \frac{138}{2} = 69, b = -66$

$|a|+|b| = 69+66 = 135$

20) $bcx + bc(b-c) - acx + ac(a+c) + abx + ab(b-a) = 3abc$

$$\begin{aligned} (bc - ac + ab)x &= 3abc + bc(c-b) - ac(a+c) + ab(b-a) \\ &= bc(a+c-b) - ac(a-b+c) + ab(a-b+c) \\ &= (a-b+c)[bc - ac + ab] \end{aligned}$$

$\Rightarrow \underline{x = a - b + c}$ Yanıt C

21) $a^2 + 16b^2 + 6a - 8b + 10 = 0$

$$\left. \begin{aligned} (a+3)^2 - 9 + (4b-1)^2 - 1 + 10 &= 0 \\ \Rightarrow a = -3, b = 1/4 \end{aligned} \right\} \begin{aligned} a^2 + 16b^2 + 16ab &= \\ &= 9 + 1 + 16 \cdot \frac{(-3)}{4} \\ &= 10 - 12 = -2 \end{aligned} \quad \underline{\underline{Yanıt C}}$$

22) 6 özdes K, 3 farklı silgi.

I.	II.	III. öğrenci
K	K	K

Kalan 3 özdes K, 3 farklı silgi.

1. durum KK KK KK. 3 farklı silgi her biri 1'er tane.
 (Her birine 1'er K) \Rightarrow dağılım sayısı: $\binom{3}{1}\binom{2}{1}\binom{1}{1} = 6$
 verildi, özdes oldukları için dağılım sayısı 1'dir

2. durum KKK KK K 1 kişiye 2 tane, 1 kişiye 1 tane K
 dağılım sayısı: $\binom{3}{2}\binom{2}{1} = 6$

Sonra 3 farklı silgiden birine 1 tane, diğersine 2 tane
 dağılım sayısı: $\binom{3}{1}\binom{2}{2} = 3$

(2 tane K verilerek kişinin seçimi $\binom{3}{1}$)
 (1 " K " " " " $\binom{2}{1}$)
Yanıt: $6 + 6 \cdot 3 = 24$ Yanıt D

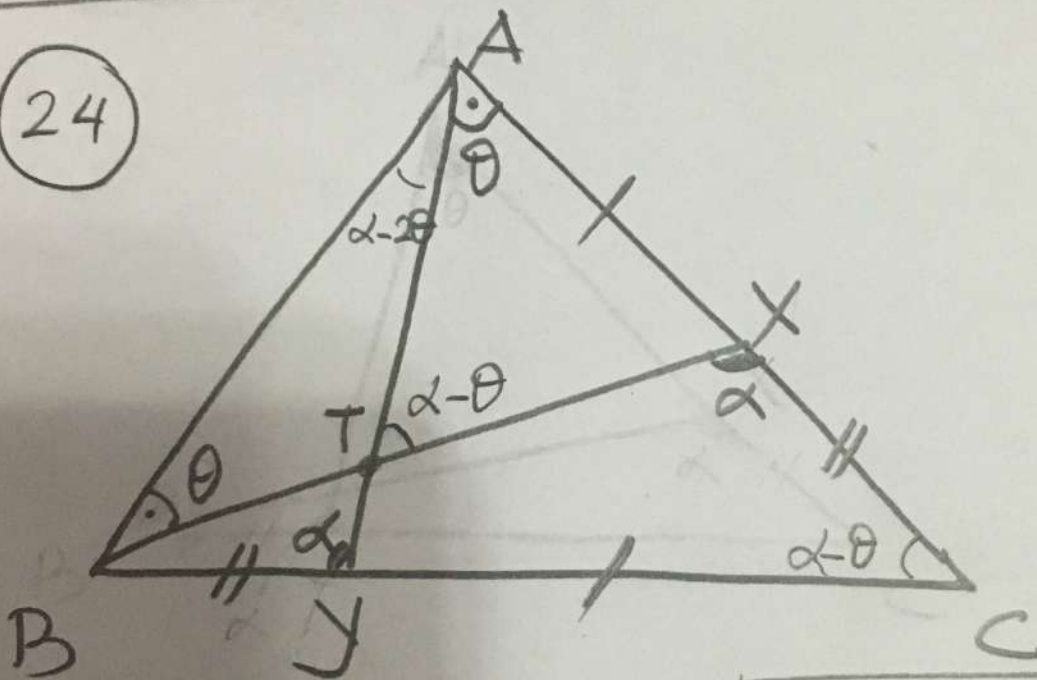
(23)

		Fazlalık	
1	19	-18	9D
2	18	-16	9B
3	17	-14	1A.
⋮	⋮		
8	12	-4	
9	11	-2	
<hr/>			
1		90	

$$2+4+\dots+18 = 2(1+2+\dots+9)$$
$$= 90 \quad \text{Yanıt}$$

$$\text{Altım} = 10 \text{ gr. } \textcircled{B}$$

(24)



$$\hat{A}T\hat{X} = \alpha - \theta = \hat{A}C\hat{B}$$

$$\Rightarrow \hat{B}A\hat{T} = \alpha - 2\theta$$

$$\Rightarrow \hat{B}A\hat{C} = \alpha - \theta \text{ dir.}$$

$$\Rightarrow |AB| = |BC|$$

$$ABX \sim CA Y$$

$$\Rightarrow \frac{AB}{AC} = \frac{AX}{CY} = \frac{BX}{AY}$$

$$\Rightarrow AX = CY, \quad BX = AY$$

$$\Rightarrow AC = CB \Rightarrow AB = BC$$

$$\Rightarrow \triangle ABC \text{ eşkenar.}$$

$$\Rightarrow \hat{A}\hat{B}\hat{C} = 60^\circ \quad \text{C siki}$$

25

A	33	11
15	B	C ₂₅
F ₂₉	D ₇	E

$$11 + 33 + A = A + 15 + F \Rightarrow F = 29$$

$$29 + B + 11 = 33 + B + D \Rightarrow D = 7$$

$$29 + 7 + E = 11 + C + E \Rightarrow C = 25$$

$$A + B + E = 29 + B + 11 \Rightarrow A + E = 40$$

$$44 + A = 36 + E \Rightarrow E - A = 8$$

$$E = 24, A = 16$$

27 sayı kullanılmadı ^{Yanıt} **D** şıkta

26 Bir Testte bulunan sayı n olsun.

$$3n + 4 = 10n \cdot \frac{35}{100} \Rightarrow 30n + 40 = 35n$$
$$\Rightarrow \boxed{n = 8}$$

$$5 \cdot 8 + 4 = 44 \quad \frac{44}{80} = \frac{11}{20} \quad \underline{\underline{0.55}}$$

Yanıt: D

27

$$|1 - |2 - |3 - |4 - \dots - |2022 - 2023|| \dots |$$

$$\left| x - \underbrace{|x+1 - |x+2 - |x+3||}_{|x+1-1| \cdot |-1|} \right|, x > 0$$

$= 0$

$$\Rightarrow 2023 \overline{) 4}$$

$\underline{\quad}$
 $\textcircled{3}$

$$\Rightarrow |1 - |2 - |3 - 0|| = 0$$

$\underline{\quad}$
 $\underline{\quad}$
 $\underline{\quad}$
 $= 0$

Yant A

