

**2017**

INTERNATIONAL STUDENT EXAM (YÖS)

**A****INTERNATIONAL STUDENT EXAM**

April 22, 2017

NAME	:	.....
SURNAME	:	.....
ID NUMBER	:	.....
SIGNATURE	:	SEAT NUMBER: .....

**IMPORTANT INFORMATION**

- This booklet includes test questions for international students who wish to study in certain Turkish universities.  
The number of questions are as follows:  

<b>Mathematics</b>	<b>40</b>
<b>Basic Learning Skills</b>	<b>40</b>
- This is an "A" type booklet. Please mark the type of your booklet on the answer sheet as shown below, and make sure it has been confirmed by the exam supervisor.  
**If you do not code the booklet type correctly on the answer sheet, your exam will be invalid.**
- You have **120 minutes** to complete the exam.
- Each question has only one correct answer. Multiple selections will be considered as incorrect.
- The answers to the questions given in the booklet should be marked by pencil on the answer sheet provided with this booklet. Please use a pencil. Do not fold the answer sheet and do not write anything not required on it.
- Inappropriate markings on the answer sheet will not be read by the optical reader. The candidate is responsible for the mistakes incurred by inappropriate markings.**
- Only correct answers will be calculated in this exam. You will not lose any points for incorrect answers.
- Further information about the examination rules are printed on the back cover of this booklet.

**TYPE OF THE QUESTION BOOKLET**

<b>A</b> ●	<b>B</b> ○
PARAPH	PARAPH

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## MATHEMATICS

1.  $\frac{2,5}{0,25} + \frac{0,2}{0,02} = ?$

- A) 10      B) 11      C) 20      D) 100      E) 101

2. What is the sum of the values of  $a$  making

$$\frac{7}{3 - \frac{a}{a+4}}$$

undefined?

- A) -4                      B) -6                      C) -14  
D) -10                      E) -5

3.  $3\sqrt{32} - \sqrt{27} + \sqrt{3} - \sqrt{2} = ?$

- A)  $2\sqrt{2} - 11\sqrt{3}$                       B)  $2\sqrt{2} + \sqrt{3}$   
C)  $11\sqrt{2} - 2\sqrt{3}$                       D)  $11\sqrt{2} - \sqrt{3}$   
E)  $11\sqrt{2} + \sqrt{3}$

4. If  $a - \frac{1}{b} = 5$ ,  $b - \frac{1}{a} = 15$  then, what is

$$\frac{a-b}{a} ?$$

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

5. Let  $x$  and  $y$  be two real numbers satisfying

$$\frac{1}{x-5} + \frac{1}{3-2y} = 0.$$

What is  $x - 2y$ ?

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

6. If  $f(x) = \int \frac{x^3 + 8}{x^2 + 2x} dx$  and  $f(2) = 0$  then, what is  $f(1) = ?$

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



7. Let  $A = \{a, b, 3, \{3\}, \square, \{3, \square\}, \{a\}\}$  and  
 $B = \{\{2\}, \Delta, a, \{b\}, 3, \square\}$

What is the total number of elements of  
 $A - B$  and  $A \cup B$ ?

- A) 10    B) 11    C) 12    D) 13    E) 14

8. Let  $a$  and  $b$  be the numbers of permutations of 4 persons around a flat and round table, respectively. What is  $a + b$ ?

- A) 8                      B) 30                      C) 48  
 D) 120                      E) 144

9. Which one of the following functions is discontinuous at  $x = 1$ ?

A)  $f(x) = \begin{cases} x-1, & x \leq 1 \\ 1-x^2, & x > 1 \end{cases}$

B)  $f(x) = \sqrt{x+5}$

C)  $f(x) = \begin{cases} 3-x, & x < 1 \\ 2, & x = 1 \\ x^3-4, & x > 1 \end{cases}$

D)  $f(x) = \begin{cases} x^2, & x < 0 \\ 1, & x > 0 \end{cases}$

E)  $f(x) = \frac{1}{x^2-4}$

10. 5A1B is a four digit number divisible by 45. What is the sum of the possible values of A?

- A) 10                      B) 12                      C) 14  
 D) 16                      E) 18

11.  $\left(\sin \frac{\pi}{6} + \cos \frac{\pi}{6}\right)^2 = ?$

- A) 0                      B) 1                      C)  $1 + \frac{1}{2}$   
 D)  $1 + \frac{\sqrt{3}}{2}$                       E)  $1 + \sqrt{3}$

12.  $f(x) = e^{\cot x} \Rightarrow \lim_{x \rightarrow \frac{\pi}{4}} \frac{f(x) - f\left(\frac{\pi}{4}\right)}{x - \frac{\pi}{4}} = ?$

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

13. A league has 10 teams. A team plays with each of the other teams exactly once. How many matches took place?

- A) 5                      B) 20                      C) 45  
D) 55                      E) 60

14. Let  $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x) = \begin{cases} x^2 - 1, & x < 4 \\ 3, & x = 4 \\ 2x + a, & x > 4 \end{cases}$$

For which  $a$  the function  $f$  has a limit at  $x = 4$ ?

- A) 4                      B) 5                      C) 6                      D) 7                      E) 8

15. How many integers  $x$  exist satisfying  $\log_3(\log_2(x-1)) \leq 1$ ?

- A) 8                      B) 7                      C) 9                      D) 10                      E) 5

16. The functions  $f$ ,  $g$  and  $h$  pass through the points A(2,1), B(1,3) and C(3,1) respectively.

If  $(hogof)(x) = x^3 - 2x + 2a$  then, what is  $a$ ?

- A) -3                      B)  $-\frac{3}{2}$                       C)  $-\frac{3}{4}$   
D) 0                      E)  $\frac{1}{2}$

17. If  $y = \frac{1}{x-5}$  then, what is

$$xy - 5y + 4 + x - \frac{1}{y} = ?$$

- A) 2                      B) 4                      C) 6                      D) 8                      E) 10

18.  $Z - |Z| = 2 - \sqrt{2}i \Rightarrow Z = ?$

- A)  $\frac{1}{2} - \sqrt{2}i$                       B)  $\frac{1}{2}i - \sqrt{2}$   
C)  $-\frac{1}{2} + \sqrt{2}i$                       D)  $i - \frac{\sqrt{2}}{2}$   
E)  $\sqrt{2} - \frac{1}{2}i$



19. What is the largest domain of the function

$$f(x) = \sqrt{5 - |x + 2|} ?$$

- A)  $-2 \leq x \leq 5$   
 B)  $-2 < x < 5$   
 C)  $-7 < x < 7$   
 D)  $-7 \leq x \leq 3$   
 E)  $-3 \leq x \leq 3$

20. What is the sum of the integers  $x$  satisfying

$$4^{2-\frac{x}{2}} \leq 1 \leq 3^{6-x} ?$$

- A) 5    B) 10    C) 15    D) 20    E) 25

21.  $\lim_{x \rightarrow 0} \frac{(\tan x)(\sqrt{x+2})}{\ln(x+1)} = ?$

- A)  $\sqrt{3}$     B)  $\sqrt{2}$     C) 0    D) 1    E) 2

22.  $\frac{\sin 10^\circ \cdot \cos 15^\circ + \sin 15^\circ \cdot \cos 10^\circ}{\cos 75^\circ \cdot \cos 10^\circ + \sin 75^\circ \cdot \sin 10^\circ} = ?$

- A) 0    B)  $\frac{1}{2}$     C)  $\frac{\sqrt{3}}{2}$     D) 1    E)  $\sqrt{3}$

23. For every real number  $x$  if

$$x^2 + ax - 7 = (x-1)(bx+c) \text{ then, what is } a+b+c?$$

- A) 14    B) -14    C) 7  
 D) 13    E) 15

24. Let  $x > 0$  and  $a = 5^x$ . What is  $\frac{25^{x+1} - 25}{5^{x+1} - 5}$

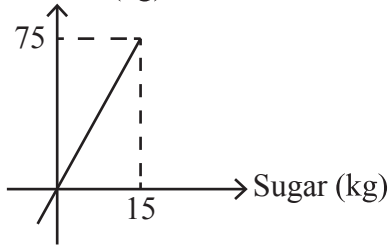
in terms of  $a$ ?

- A)  $3(a+1)$     B)  $5(a+1)$   
 C)  $3(a-1)$     D)  $-5(a+1)$   
 E)  $5(a-1)$

25.  $(9^a + 4)(3^a - 2)(3^a + 2) = 11 \Rightarrow a = ?$

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

26. Mixture (kg)



The above figure shows the mixture of sugar-water and sugar in this mixture.

What is the water percentage in this mixture?

- A) 20                      B) 25                      C) 50  
D) 80                      E) 85

27.  $f(x) = \int_2^{x^3+5} (2t+1) dt \Rightarrow f'(x) = ?$

- A)  $6x^5 - 33x^2$                       B)  $6x^5 + 33x^2$   
C)  $6x^2 - 33x^5$                       D)  $-6x^5 - 33x^2$   
E)  $-6x^2 + 33x^5$

28. If  $a$  and  $b$  are non zero real numbers and

$$\frac{2a+b}{3} = \frac{b}{2} \text{ then, what is } \frac{2ab-b^2}{a^2+b^2} ?$$

- A) 0                      B)  $-\frac{8}{15}$                       C)  $\frac{8}{5}$   
D)  $\frac{24}{17}$                       E)  $-\frac{8}{17}$

29. The length of a footstep of a man is 50 cm. If he walks 35 steps in a minute then, how many meters can he walk in an hour?

- A) 500                      B) 700                      C) 1000  
D) 1050                      E) 2100

30. Let  $x$  be a positive even number. How many different positive integer values exist for

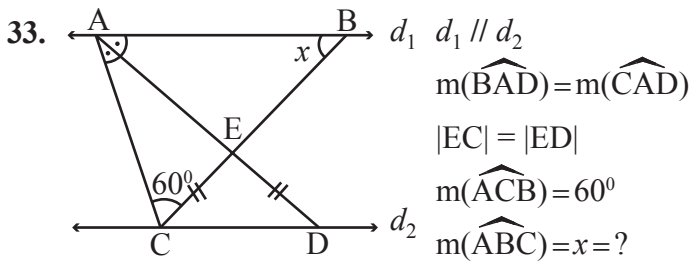
$$\frac{5x+140}{x} ?$$

- A) 8                      B) 9                      C) 7                      D) 10                      E) 6

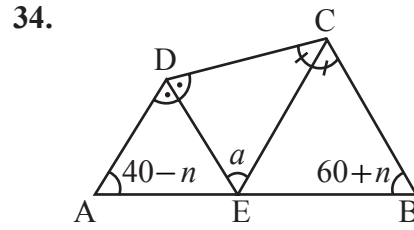
31.  $\log_5(\log_2(3x-1))=1 \Rightarrow x=?$   
 A) 9      B) 10      C) 11      D) 12      E) 13

32. Let  $a$  and  $b$  be positive integers. If  $2a^2 - 3ab - 5b^2 = 0$  then, what is the minimum value of  $a+b$ ?

- A) 8      B) 7      C) 6      D) 5      E) 4

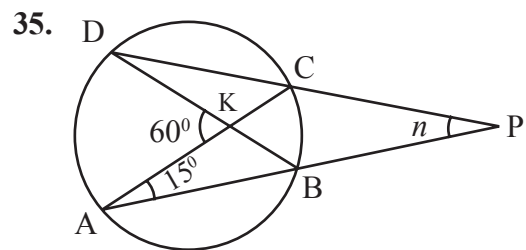


- A) 20      B) 25      C) 30  
 D) 35      E) 40



ABCD quadrangle,  
 [DE], bisector  
 [CE], bisector  
 $m(\widehat{DAB}) = 40 - n$   
 $m(\widehat{ABC}) = 60 + n$   
 $m(\widehat{DEC}) = a = ?$

- A) 30      B) 40      C) 50  
 D) 60      E) 70

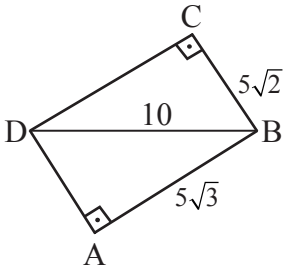


A, B, C, D on the circle  
 $m(\widehat{DKA}) = 60^\circ$   
 $m(\widehat{CAP}) = 15^\circ$   
 $m(\widehat{APD}) = n = ?$

- A) 10      B) 15      C) 20  
 D) 25      E) 30



36.



ABD and BCD right triangles

$$|AB| = 5\sqrt{3} \text{ cm}$$

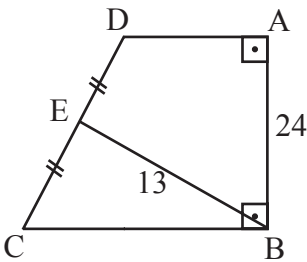
$$|BC| = 5\sqrt{2} \text{ cm}$$

$$|DB| = 10 \text{ cm}$$

$$m(\widehat{ADC}) = ?$$

- A) 105                      B) 110                      C) 120  
D) 125                      E) 150

37.



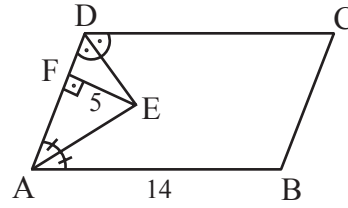
ABCD trapezoid,  $[AD] \parallel [BC]$ ,  $[AB] \perp [BC]$ ,

$$|DE| = |EC|, |AB| = 24 \text{ cm}, |EB| = 13 \text{ cm}.$$

$$\text{Area}(ABCD) = ?$$

- A) 100                      B) 120                      C) 130  
D) 140                      E) 156

38.



ABCD parallelogram,  $[DE]$  and  $[AE]$  are bisectors,

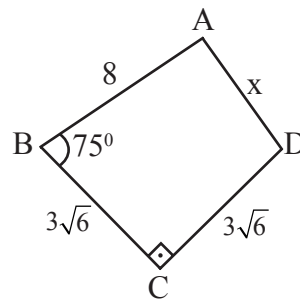
$$[EF] \perp [AD], |EF| = 5 \text{ cm},$$

$$|AB| = 14 \text{ cm},$$

$$\text{Area}(ABCD) = ?$$

- A) 35                      B) 70                      C) 85  
D) 105                      E) 140

39.



ABCD quadrangle,  $[BC] \perp [CD]$

$$|AB| = 8 \text{ cm}$$

$$|BC| = |CD| = 3\sqrt{6} \text{ cm}$$

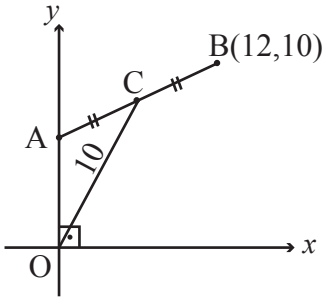
$$m(\widehat{ABC}) = 75^\circ$$

$$|AD| = x = ?$$

- A) 10                      B)  $2\sqrt{13}$                       C)  $2\sqrt{7}$   
D)  $3\sqrt{7}$                       E)  $2\sqrt{5}$



40.

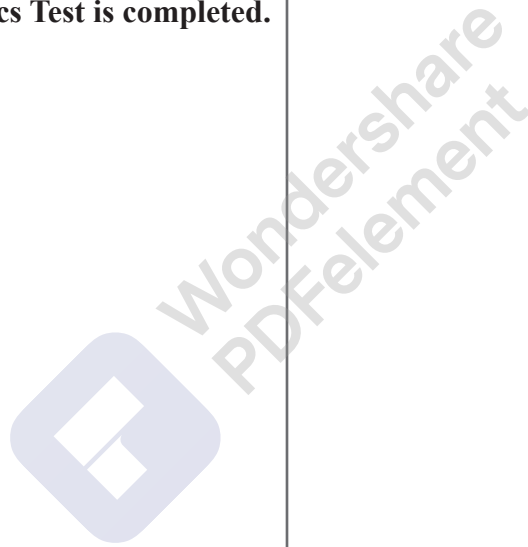


$|AC| = |CB|$ ,  $|OC| = 10$  cm and  $B(12,10)$ .

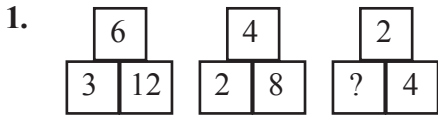
What is the ordinate ( $y$ ) of the point A?

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

**Mathematics Test is completed.**



**BASIC LEARNING SKILLS**



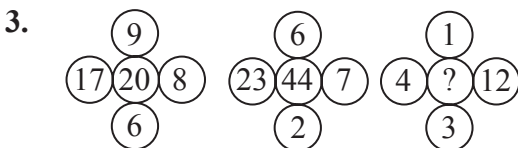
Which one of the following should be replaced in the question mark (?)?

- A) 1      B) 2      C) 4      D) 8      E) 16



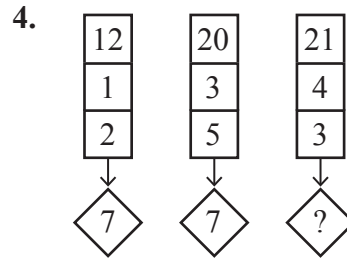
Which one of the following should be replaced in the question mark (?)?

- A)      B)   
 C)      D)   
 E)



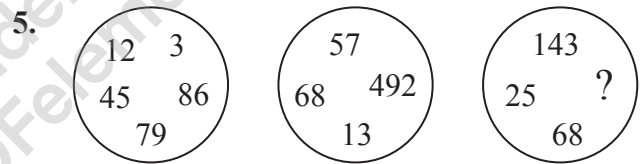
Which one of the following should be replaced in the question mark (?)?

- A) 12      B) 16      C) 24      D) 30      E) 36



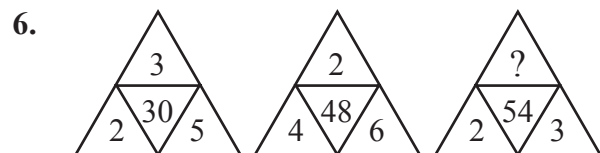
Which one of the following should be replaced in the question mark (?)?

- A) 27      B) 5      C) 10      D) 11      E) 6



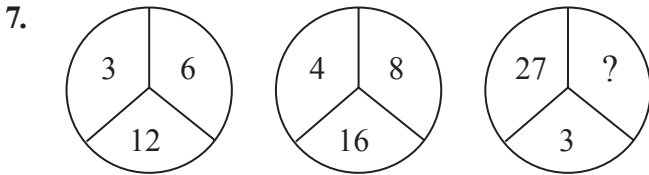
Which one of the following should be replaced in the question mark (?)?

- A) 79      B) 96      C) 78  
 D) 13      E) 45



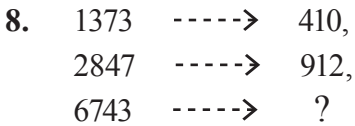
Which one of the following should be replaced in the question mark (?)?

- A) 11      B) 10      C) 9      D) 17      E) 19



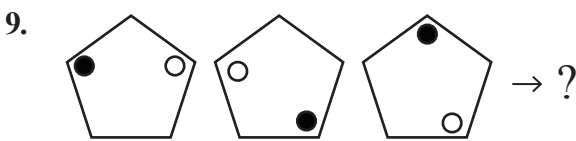
Which one of the following should be replaced in the question mark (??)

- A) 13    B) 22    C) 8    D) 16    E) 9



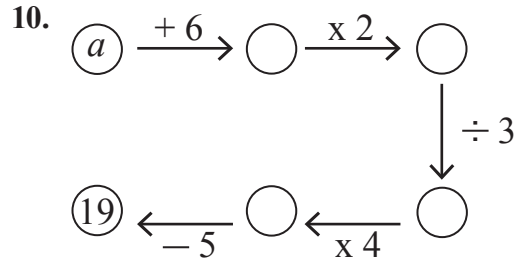
Which one of the following should be replaced in the question mark (??)

- A) 1010    B) 911    C) 427  
 D) 137    E) 713



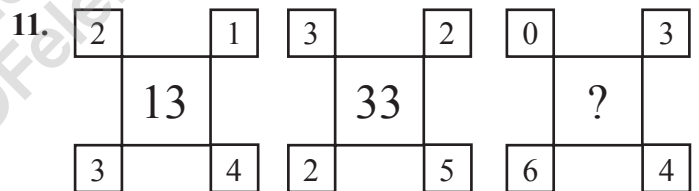
Which one of the following should be replaced in the question mark (??)

- A)    B)   
 C)    D)   
 E)



$a=?$

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



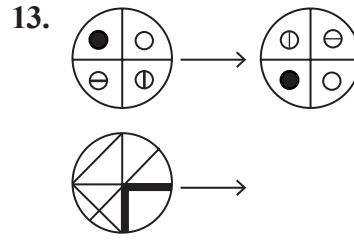
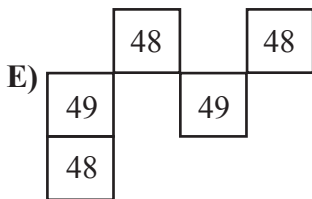
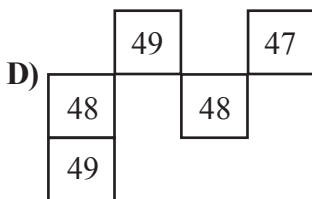
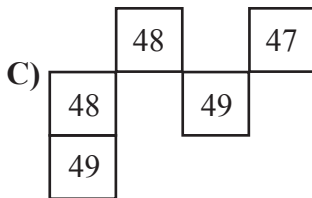
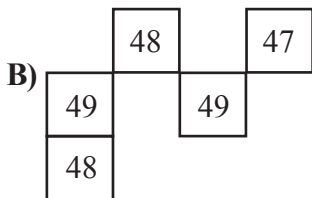
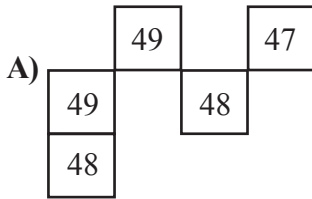
Which one of the following should be replaced in the question mark (??)

- A) 217    B) 18    C) 72  
 D) 12    E) 65

12.

50	51	49	52	48
46	47	45	48	44
49	50	?	51	?
47	?	46	?	45
48	?	47	50	46

Which one of the following should be replaced in the question mark (?)?



Which one of the following should be replaced in the question mark (?)?



14.  $\overrightarrow{ABCD} = ACBD$  ,  $\overleftarrow{ABCD} = DBCA$

$\leftrightarrow ABCD = BADC$

$3\overleftarrow{A5D} + 3\overrightarrow{DA5} - \overleftrightarrow{A35D} = 7253$

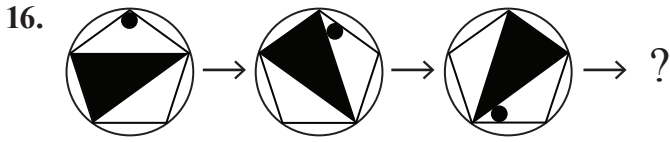
$\Rightarrow A + D = ?$

- A) 9      B) 10      C) 11      D) 12      E) 13

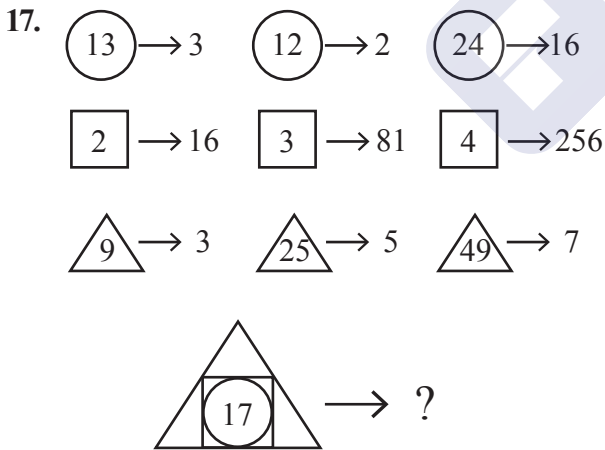
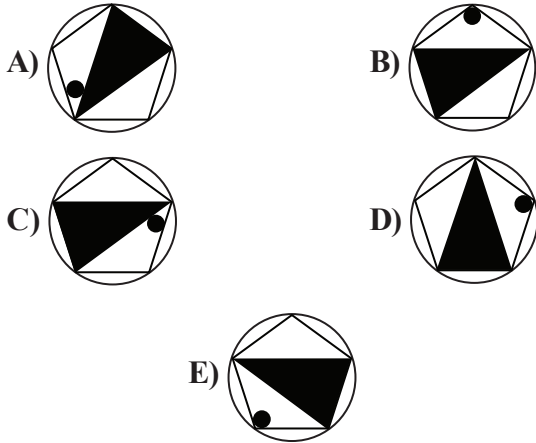
15. -1, 2, 14, ?, 254, 1022

Which one of the following should be replaced in the question mark (?)?

- A) 32      B) 48      C) 57      D) 62      E) 126

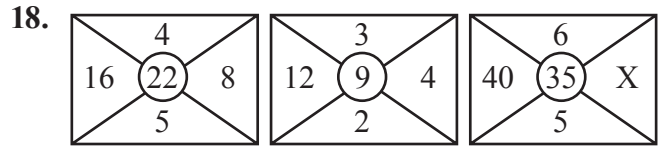


Which one of the following should be replaced in the question mark (?)?



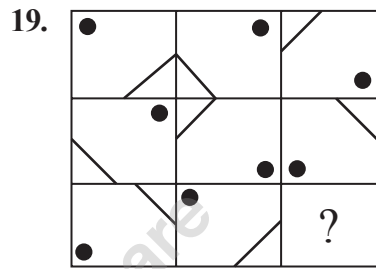
Which one of the following should be replaced in the question mark (?)?

- A) 100                      B) 81                      C) 49  
 D) 56                      E) 25

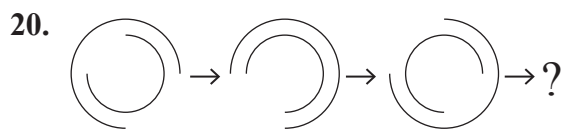
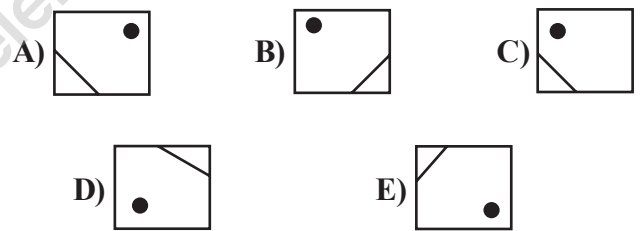


X = ?

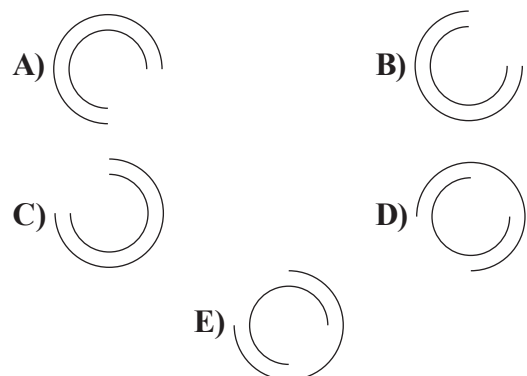
- A) 2                      B) 4                      C) 6                      D) 8                      E) 10

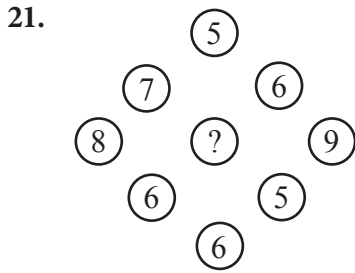


Which one of the following should be replaced in the question mark (?)?



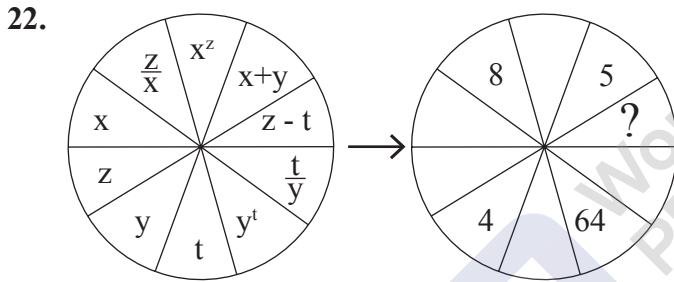
Which one of the following should be replaced in the question mark (?)?





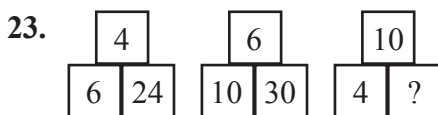
Which one of the following should be replaced in the question mark (?)?

- A) 4    B) 5    C) 6    D) 7    E) 8



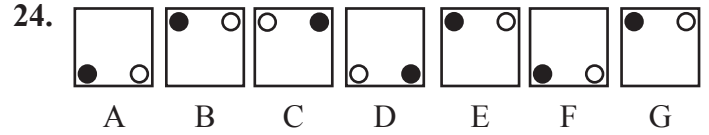
Which one of the following should be replaced in the question mark (?)?

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

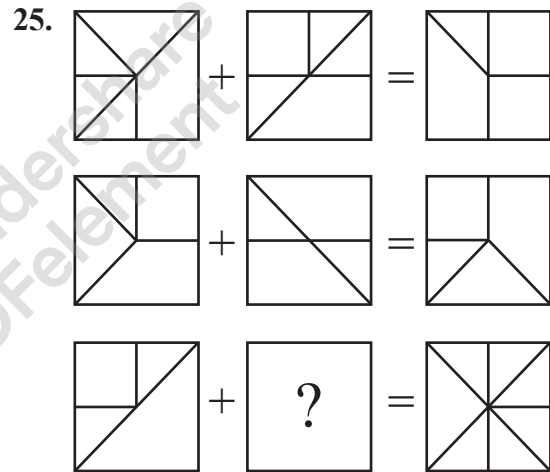
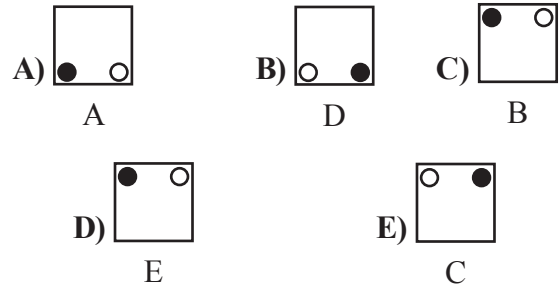


Which one of the following should be replaced in the question mark (?)?

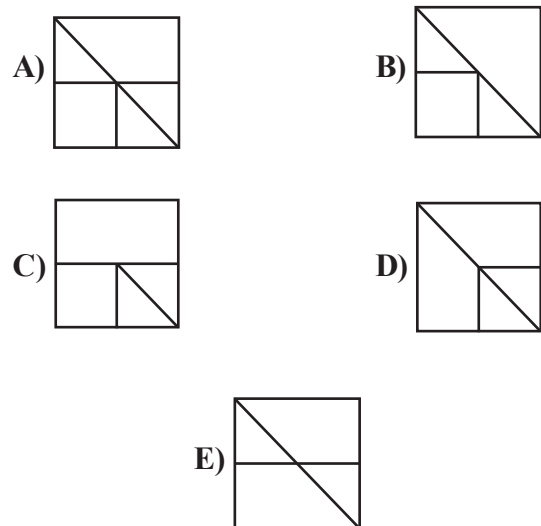
- A) 24    B) 26    C) 28    D) 30    E) 32



Which is the odd one out?



Which one of the following should be replaced in the question mark (?)?



26. 

7	5	6	4	?
9	3	8	2	?
2	7	1	6	?
4	5	3	4	?

Which one of the following should be replaced in the question mark (??)

- A) 

2
0
5
7

      B) 

7
5
2
0

      C) 

2
4
3
5
- D) 

7
5
3
5

      E) 

5
7
0
2

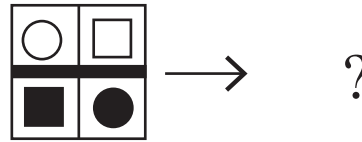
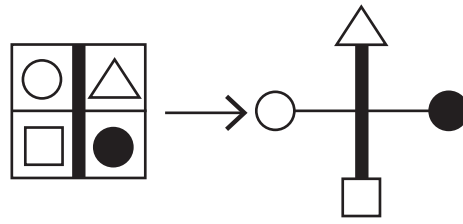
27. 

4	→	45	→	11.3	→	41.3	→	x	→	y	→	25.9	→	33.9
---	---	----	---	------	---	------	---	---	---	---	---	------	---	------

(x, y) = ?

- A) (7.6, 48.6)      B) (18.3, 37.3)  
 C) (18.6, 37.6)      D) (7.3, 43.3)  
 E) (3.7, 48.6)

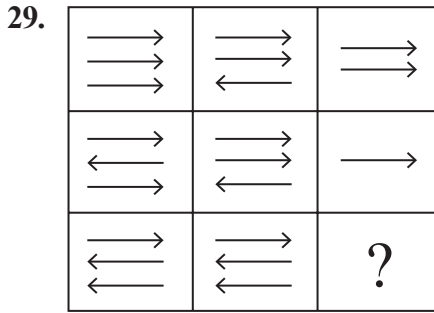
28.



Which one of the following should be replaced in the question mark (??)

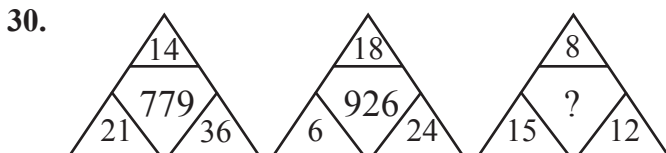
- A)
- B)
- C)
- D)
- E)





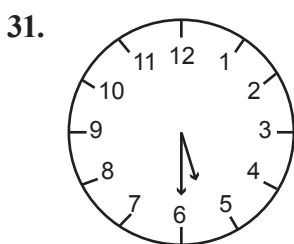
Which one of the following should be replaced in the question mark (?)?

- A) ←  
←  
←      B) →  
←  
←      C) ←  
←  
←
- D) →  
→  
→      E) →  
→  
←



Which one of the following should be replaced in the question mark (?)?

- A) 253      B) 356      C) 365
- D) 453      E) 465



The clock in the figure shows 5:30.

How do the potential energies of hour hand and minute hand changes after 30 minutes?

- |    | <u>Hour hand</u> | <u>Minute hand</u> |
|----|------------------|--------------------|
| A) | Increase         | Decrease           |
| B) | Increase         | Increase           |
| C) | Decrease         | Increase           |
| D) | Decrease         | Decrease           |
| E) | No change        | No change          |

32. A gas container has volume  $V$  and pressure  $P$ .

At a constant temperature what will be the volume of the container if the pressure is  $2P$ ?

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

33. Which one of the following is not inherited?

- A) Eye color      B) Hair color
- C) Blood type      D) Weight
- E) 6 finger

34. Which one of the following elements is a molecule?

- A)  $H$       B)  $He$       C)  $H_2$
- D)  $Li$       E)  $N$

35. A substance looks blue under white light. Which one of the following explains this situation?

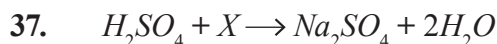
- A) Substance absorbs the light
- B) Substance reflects the light
- C) Substance absorbs the blue light
- D) Substance reflects the blue light
- E) Substance absorbs the yellow light



36. Substances K, L, M are at equal weight and temperature. If they get equal heat energy then, their temperatures are related with  $T_K < T_L < T_M$

Which one of the following is exactly true?

- A) The specific heat capacity of K is smaller than that of M.
- B) The specific heat capacity of K is greater than that of M.
- C) The specific heat capacity of K is smaller than that of L.
- D) The specific heat capacity of M is greater than that of L.
- E) The specific heat capacities of K, L and M are equal.



What is X in the above reaction?

- A)  $Na_2O$
- B)  $NaOH$
- C)  $H_2O$
- D)  $2SO_4$
- E)  $2NaOH$

38. A car travels 450 kilometers in 5 hours. What is the average velocity of the car?

- A) 90 km/h
- B) 100 km/h
- C) 80 km/h
- D) 110 km/h
- E) 70 km/h

39. Which one of the following reactions is correct?

- A)  $H_2 + O_2 \rightarrow H_2O$
- B)  $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
- C)  $Na + Cl_2 \rightarrow 2NaCl$
- D)  $2Mg + 3O_2 \rightarrow MgO$
- E)  $H_2SO_4 + NaOH \rightarrow Na_2SO_4 + H_2O$

40. If it rains in a sunny day then, rainbow forms at sky.

Which one of the following is wrong according to above data?

- A) White light is a combination of all other colors.
- B) Light breaks when it travels through two different mediums.
- C) Light with different colors break at different angles in a same medium.
- D) The speed of blue light is greater than that of red light.
- E) If light does not change place then, there is no breaking.



# 2017

## INTERNATIONAL STUDENT EXAM (OMÜ YÖS)

# A

## EXAMINATION RULES

**1.** Following materials are prohibited in exam room: Any communication equipments e.g. pagers, walkie-talkies, PDA's, watches with any other functions, weapons, notebooks, books, dictionaries, any electronic device with dictionary function, calculators, calculation charts, compasses, goniometers, rulers and etc. If any candidate enters the exam room with the prohibited materials, his/her name will be recorded and their examinations will be considered invalid.

**2.** Duration of the exam is **120** minutes. Candidates are allowed to take the exam if they are not late for more than **30** minutes. Candidates are not allowed to leave the exam room in the first **40** minutes and the last **5** minutes of the examination. Candidates who completed the exam or left the examination room will not be allowed to re-enter the examination room. If you complete the exam before the end of the duration you can leave the room after submitting your question booklet and answer sheet. When the end of the examination is announced you must remain seated and may not leave the examination room until all papers are collected by the invigilators.

**3.** Communicating with the invigilators during the examination is prohibited. Similarly, it is prohibited for the staff to talk to candidates privately. Candidates are not allowed to exchange pencils, erasers, papers etc. during the exam.

**4.** The exam of any candidate who cheats, attempts to cheat or assists cheating will be considered invalid and his/her identity will be recorded. Invigilators do not have to warn the students about cheating. The candidate is responsible for his/her actions. Answers of the candidates will be examined electronically. If any suspicious case is detected regarding individual or collaborate cheating, the exams of all candidates who participate in this action will be considered invalid. If invigilators report any case of misconduct in the application of the exam or collaborate cheating, OMÜ-YÖS Coordinating Office may decide to consider all of the candidates' exams invalid for that room.

**5.** All candidates must obey the rules in the exam room. If necessary, your seat may be changed by invigilators. Obeying the rules is of utmost importance for validation of the exam. Identity of any candidate who engages in misconduct and does not heed the invigilator's warning to discontinue the behavior, will be recorded and his/her

examination will be considered invalid.

**6.** You must fill all the required fields on the answer sheet. Only pencils should be used for marking and writing on the answer sheet. Pens or ball point pens should not be used. All the answers should be marked on the answer sheet. Answers marked on the question booklet will be considered invalid.

**7.** Please check your question booklet for missing pages or typos after receiving it. If there are any missing pages or typos on your booklet, please immediately request for the change of the booklet from the head invigilator. You should also check if the booklet type written on the cover page is the same as the booklet type written on every page of the booklet. If you find any difference, please request a new booklet from the head invigilator. If you realise any difference about booklet types after you start the examination, request a new booklet of the same type you have answered. Please mark your booklet type on the "Question Booklet Type" area on the answer sheet. Booklet type you have marked will be checked by the invigilators and initialed with a pen. If the related area is not initialed, your answer sheet will not be evaluated. If there is difference between the booklet types that you have marked and the invigilator has marked, evaluation will be based on the one that is marked by invigilators.

**8.** Please write your name, surname and candidate number on the question booklet before starting to answer the questions. All the question booklets and answer sheets will be collected and examined at the end of the examination. In case of missing pages, examination of the related candidate will be considered invalid.

**9.** You can use the spaces on the question booklet for calculation.

**10.** Smoking (cigarettes, pipes, cigars etc.) is not allowed during the examination for both candidates and the staff.

**11.** Writing the questions and/or the answers and taking it out is strictly prohibited.

**12.** Do not forget to submit your question booklet and answer sheet before leaving the exam room.