



# A

## ONDOKUZ MAYIS UNIVERSITY INTERNATIONAL STUDENT EXAM

May 18, 2013

NAME : .....

SURNAME : .....

CANDIDATE NO : .....

SIGNATURE : SEAT NUMBER: .....

### GENERAL INFORMATION

1. This booklet includes test questions for international students who wish to study in certain Turkish universities.

The number of questions are as follows:

1. **Mathematics** 40  
2. **Basic Learning Skills** 40

2. 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 correct booklet type on the answer sheet, your exam will be invalid.**

3. You have 120 minutes to complete the exam.

4. You may start answering the questions in any order you wish.

5. Each question has only one correct answer. Multiple selections will be considered as incorrect.

6. The answers to the questions given in the booklet should be marked on the answer sheet provided with this booklet. Please use a pencil. Do not fold the answer sheet and do not write anything on it that is not required.

7. Inappropriate markings on the answer sheet will not be read by the optical reader. You are entirely responsible for mistakes incurred by inappropriate markings.

8. Only correct answers will be calculated in this exam. You will not lose any points for incorrect answers.

9. Further information on examination rules are given on the back page of this booklet.

#### TYPE OF QUESTION BOOKLET

A ●	B ○
PARAPH	PARAPH



# MATHEMATICS

1. 
$$\frac{5^{-1} : \left(\frac{1}{5} - 1\right)}{(-2^{-2}) \left(2 - \frac{1}{2}\right)} = ?$$

- A)  $-\frac{2}{3}$       B)  $-\frac{1}{24}$       C)  $\frac{1}{24}$   
 D)  $\frac{2}{3}$       E)  $\frac{3}{2}$

2. 
$$\frac{\frac{1}{2}}{3} - \frac{1}{\frac{2}{3}} = ?$$

- A)  $-\frac{8}{3}$       B)  $-\frac{4}{3}$       C)  $-\frac{3}{4}$   
 D)  $\frac{3}{4}$       E)  $\frac{4}{3}$

3. 
$$\frac{1}{\frac{0,1}{0,11} + \frac{0,3}{0,33} - \frac{0,6}{0,66}} = ?$$

- A) 1,1      B) 1,11      C) 10      D) 11      E) 33

4. 
$$\frac{4}{0,2} - (0,25)^{-2} + 1 = ?$$

- A) 0,2      B) 0,5      C) 1      D) 4      E) 5

5. 
$$\frac{a}{2} \left| \frac{3}{b} \right. \quad \frac{b}{4} \left| \frac{5}{c} \right. \quad \frac{a}{k} \left| \frac{15}{m} \right. , \quad k = ?$$

- A) 6      B) 8      C) 11      D) 13      E) 14

6.  $a = 3,4\bar{5}$

$$b = (3-a) \frac{5}{41}$$

$$b = ?$$

A)  $-\frac{1}{12}$

B)  $-\frac{1}{18}$

C)  $-\frac{1}{41}$

D)  $\frac{1}{18}$

E)  $\frac{1}{12}$

7.  $x + y + z = 4$ ,  $x = ?$   
 $xy + xz = 4$

A) -2

B) 1

C)  $\sqrt{2}$

D) 2

E) 4

8.  $\frac{1}{a} + \frac{1}{b} = 15$

$$\frac{1}{b} + \frac{1}{c} = 17, \quad c = ?$$

$$\frac{1}{a} + \frac{1}{c} = 12$$

A)  $\frac{1}{13}$

B)  $\frac{1}{10}$

C)  $\frac{1}{7}$

D)  $\frac{1}{6}$

E)  $\frac{1}{5}$

9.  $\frac{a-1}{a+2} = \frac{a-3}{a+1}$ ,  $a = ?$

A) -6

B) -5

C) -3

D) 3

E) 5

$$10. \frac{\sqrt{21} - \sqrt{15} + \sqrt{10} - \sqrt{14}}{\sqrt{7} - \sqrt{5}} (\sqrt{3} + \sqrt{2}) = ?$$

- A) 1    B)  $\sqrt{6}$     C) 3    D) 5    E)  $5 + 2\sqrt{6}$

$$11. \sqrt{0,1}(\sqrt{3,6} + \sqrt{1,6}) = ?$$

- A) 0,1    B)  $\sqrt{0,52}$     C) 1    D)  $\sqrt{10}$     E) 10

$$12. \begin{cases} x = 3^{n+2} \\ 3x = 9^{n+3} \end{cases}, \quad n = ?$$

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

$$13. \frac{2^{2x+2} - 2^4}{2^x + 2} : \frac{2^x - 2}{8} - 1 = ?$$

- A) 30    B) 31    C) 32    D) 33    E) 34

$$14. xy > 0 \quad \text{and} \quad x^2y < 0$$

$$\frac{|x| - |x+y| - 1}{1-y} = ?$$

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

$$15. (xy)_7 = (yx)_9$$

$$x + y = ?$$

- A) 4    B) 5    C) 7    D) 11    E) 12

16.  $f : \mathbb{R} \rightarrow \mathbb{R}, \quad g : \mathbb{R} \rightarrow \mathbb{R},$

$$f(1-x) = x+3, \quad g\left(\frac{x}{2}+1\right) = 2x-1$$

$$(f \circ g)(1) = ?$$

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

17.  $f(x-3) = 5f(x-2)$

$$f(2) = 5$$

$$f(11) = ?$$

- A)  $5^{-5}$     B)  $5^{-6}$     C)  $5^{-7}$     D)  $5^{-8}$     E)  $5^{-9}$

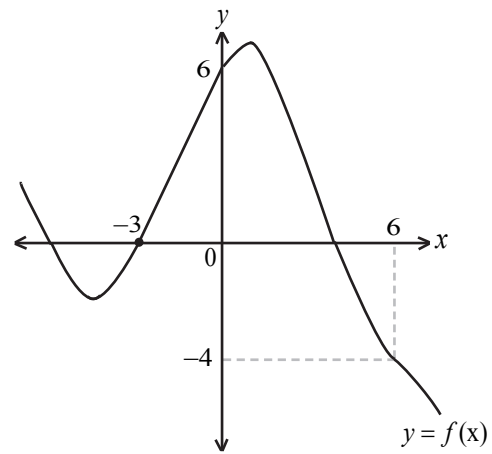
18.  $f : \mathbb{R} \setminus \left\{\frac{7}{5}\right\} \rightarrow \mathbb{R} \setminus \left\{\frac{3}{5}\right\} \Rightarrow$

$$5xf(x) + 2 = 3x + 7f(x)$$

$$f^{-1}(5) = ?$$

- A)  $\frac{1}{3}$     B)  $\frac{1}{2}$     C)  $\frac{3}{5}$   
 D)  $\frac{2}{3}$     E)  $\frac{3}{2}$

19.



$$(f \circ f \circ f)(-3) = ?$$

- A) -4    B) -3    C) 0    D) 4    E) 6

20.  $2\ln x - \ln y = 1$   
 $\ln(xy) = 2$   
 $x + y = ?$

- A)  $e$     B)  $2e$     C)  $e+2$     D)  $e^{-1}$     E)  $4e$

21.  $\log_3(81 \cdot \log_x 64) = 5$   
 $x = ?$

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

22.  $z \in \mathbb{C}, z = -1 + i\sqrt{7}$   
 $z \cdot \bar{z} = ?$

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

23.  $\frac{\tan x - \sin x}{1 - \sec x} = ?$

- A)  $-\sin x$     B)  $-\cos x$     C)  $\cos x$   
D)  $\sin x$     E)  $\tan x$

24.  $\lim_{x \rightarrow 2} \frac{\sqrt{2x-2}}{x-2} = ?$

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

25.  $\lim_{x \rightarrow \infty} \frac{8x^2 - 3x + 4}{2x^2 - x + 1} = ?$

- A) -4    B) -2    C) 0    D) 2    E) 4

26.  $\lim_{x \rightarrow 3} \frac{9-x^2}{\tan(3-x)} = ?$

- A) -6    B) -3    C) 0    D) 3    E) 6

27.  $f(x) = (x^2 + 2)(x^3 - 2x)$   
 $f'(-1) = ?$

- A) -9    B) -4    C) 1    D) 4    E) 5

28.  $f(x) = \sin^2 4x$   
 $\lim_{h \rightarrow 0} \frac{f\left(\frac{\pi}{16} + h\right) - f\left(\frac{\pi}{16}\right)}{h} = ?$

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

29.  $f(3x-2) = 5x^3 + 3x^2 + 7$   
 $f'(4) = ?$

- A) 24    B) 16    C) 0    D) -16    E) -24

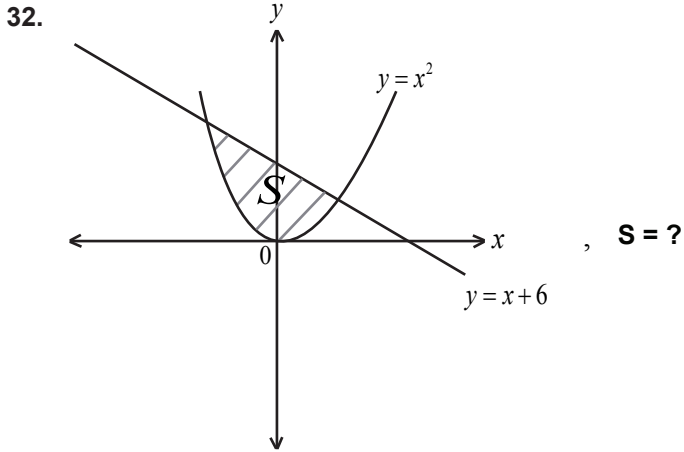
30.  $f'(x) = 2x + 1$   
 $f(1) = 4$   
 $f(2) = ?$

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

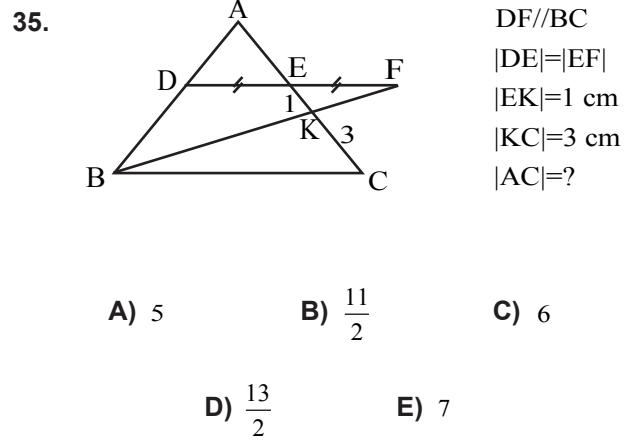
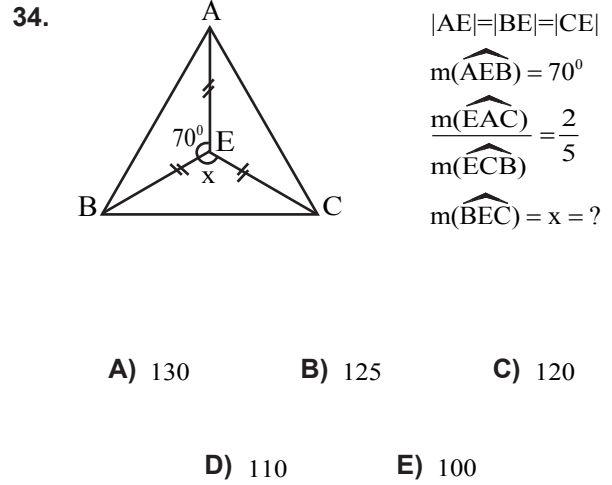
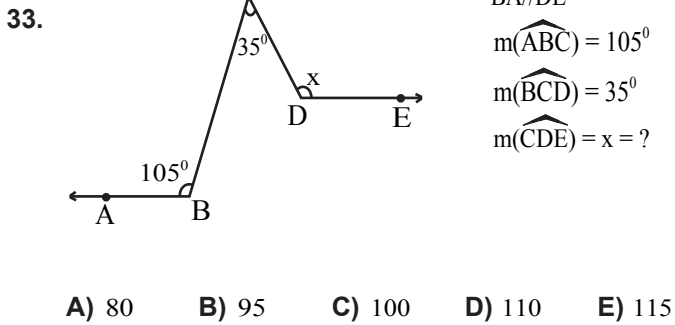
31.  $\int_0^{\pi/4} \frac{\cos 2x}{1 + \sin^2 2x} dx = ?$

- A)  $\frac{\pi}{4}$     B)  $\frac{\pi}{8}$     C) 0  
D)  $-\frac{\pi}{8}$     E)  $-\frac{\pi}{4}$

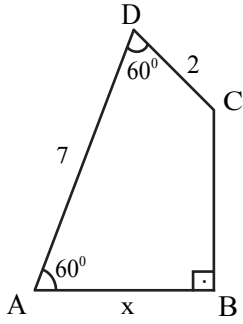




- A)  $\frac{80}{7}$       B)  $\frac{100}{7}$       C)  $\frac{120}{7}$   
D)  $\frac{123}{6}$       E)  $\frac{125}{6}$



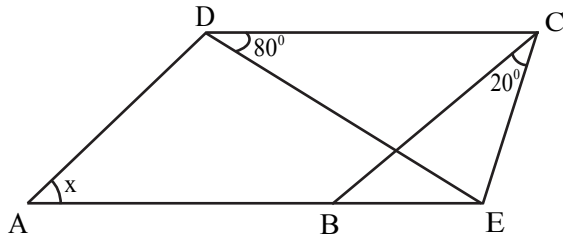
36.



$CB \perp AB$   
 $m(\widehat{ADC}) = m(\widehat{DAB}) = 60^\circ$   
 $|DC| = 2 \text{ cm}$   
 $|AD| = 7 \text{ cm}$   
 $|AB| = x = ?$

- A)  $\frac{7}{2}$       B) 4      C)  $\frac{9}{2}$   
 D) 5      E)  $\frac{11}{2}$

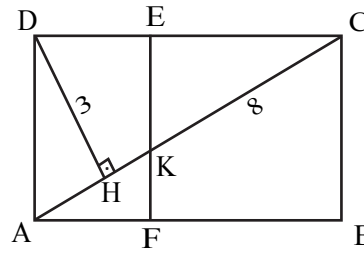
37.



ABCD parallelogram  
 $|AB| = |DE|$   
 $m(\widehat{CDE}) = 80^\circ$   
 $m(\widehat{BCE}) = 20^\circ$   
 $m(\widehat{DAE}) = x = ?$

- A) 20      B) 30      C) 40      D) 50      E) 60

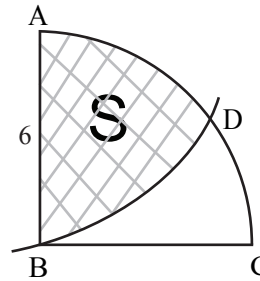
38.



ABCD rectangle  
 $DH \perp AC$   
 $|DH| = 3 \text{ cm}$   
 $|KC| = 8 \text{ cm}$   
 $|FB| = 4|AF|$   
 Area(BCEF) = ?

- A) 12      B) 16      C) 24      D) 36      E) 48

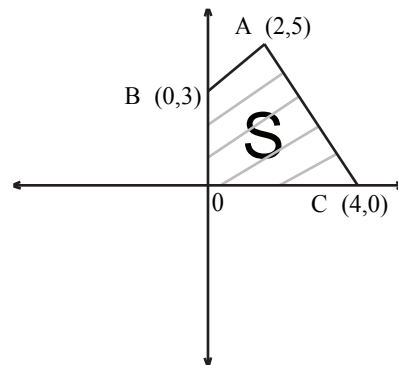
39.



B centered quadrant and A centered arc  $\widehat{BD}$  are drawn.  
 $|AB| = 6 \text{ cm}$   
 $S = ?$

- A)  $12\pi - 9\sqrt{3}$       B)  $12\pi - 8\sqrt{3}$       C)  $6\pi - 6\sqrt{3}$   
 D)  $12\pi - 6\sqrt{3}$       E)  $12\pi - 3\sqrt{3}$

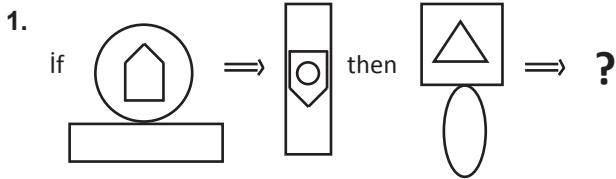
40.



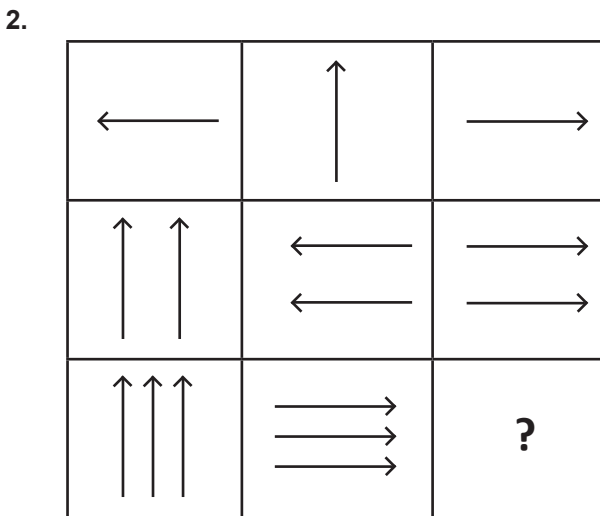
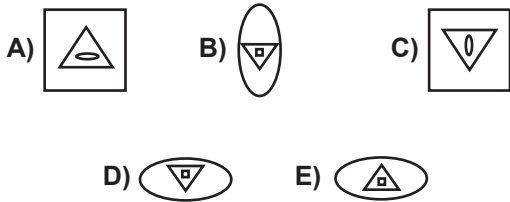
$S = ?$

- A) 8      B) 10      C) 13      D) 15      E) 16

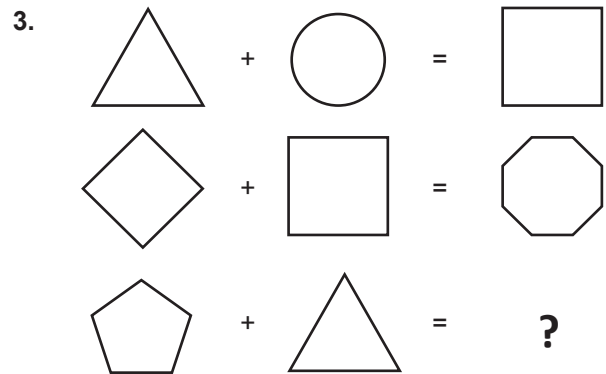
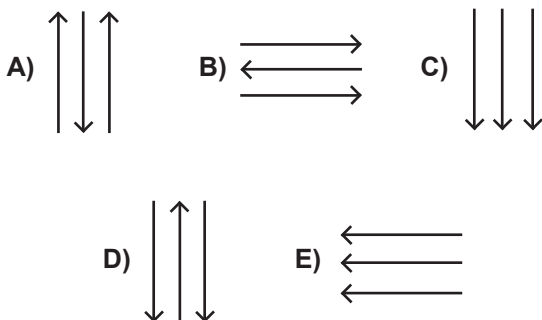
**BASIC LEARNING SKILLS**



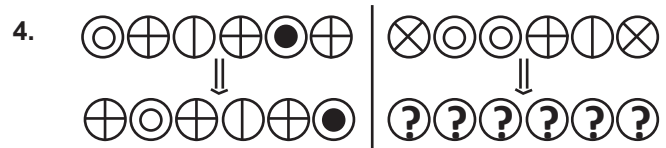
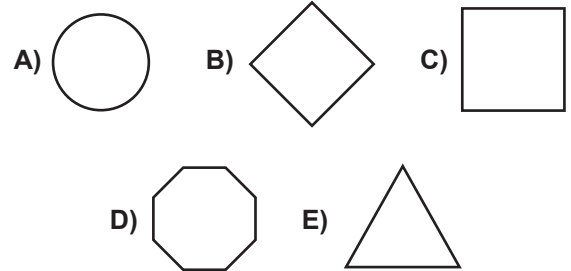
Which figure should replace the question mark (?) ?



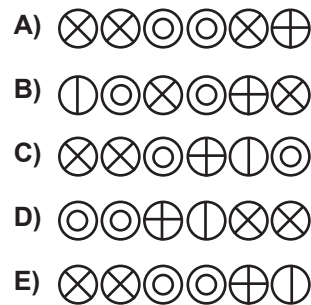
Which figure should replace the question mark (?) ?

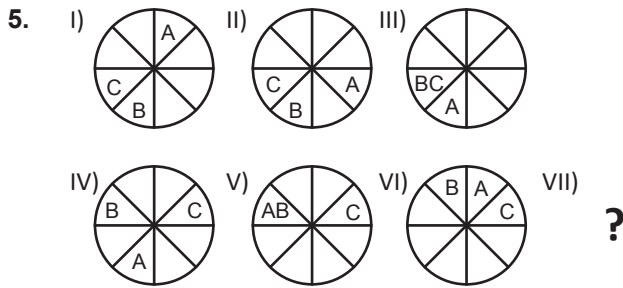


Which figure should replace the question mark (?) ?

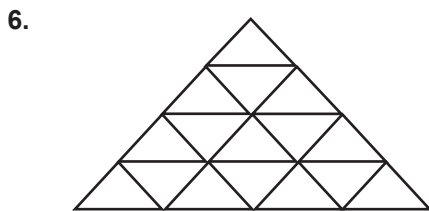
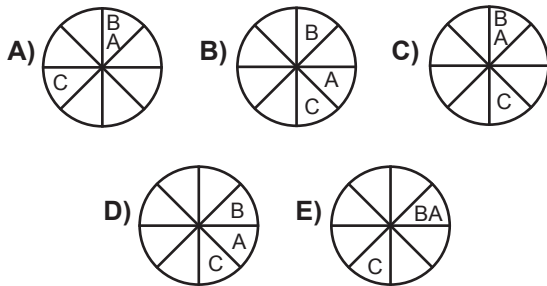


Which figure should replace the question mark (?) ?





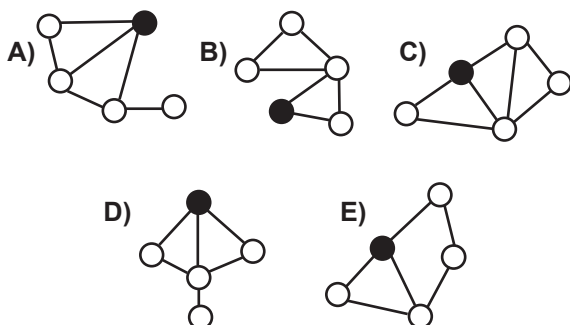
Which figure should replace the question mark (?) ?



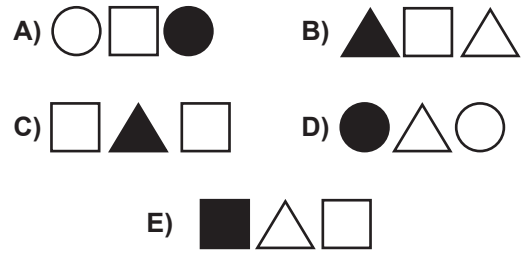
Above figure is made up of equilateral triangles. How many different sized triangles are in the figure?

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

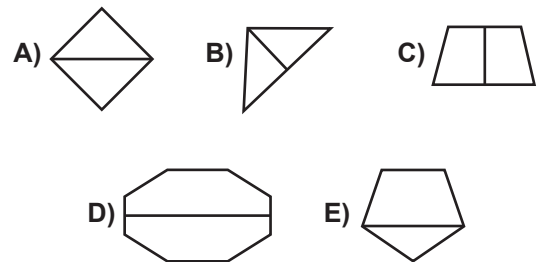
7. If the figures below form a group, which logically is the odd one out?



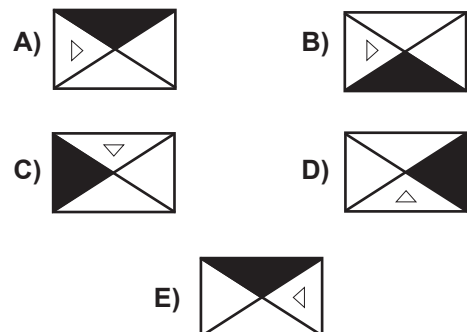
8. If the figures below form a group, which logically is the odd one out?



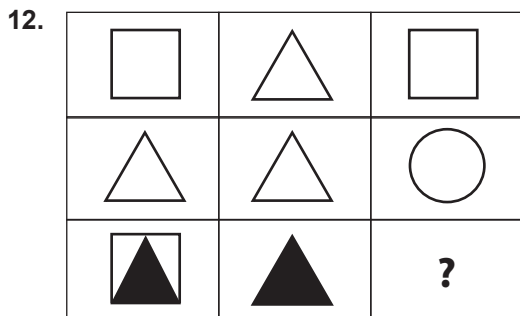
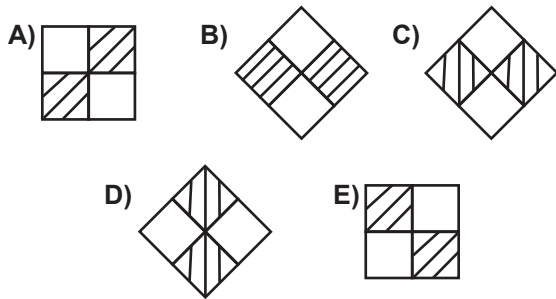
9. If the figures below form a group, which logically is the odd one out?



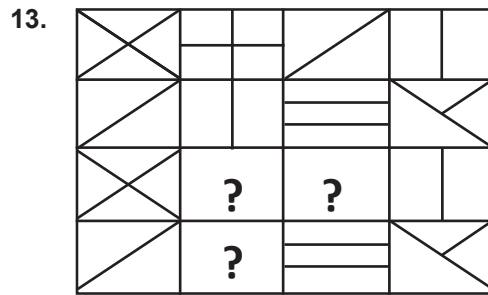
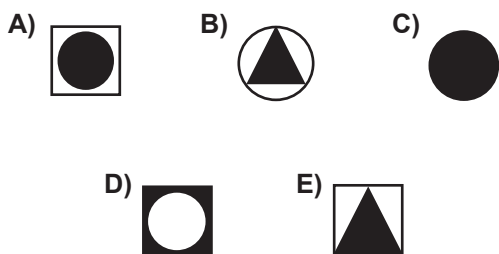
10. If the figures below form a group, which logically is the odd one out?



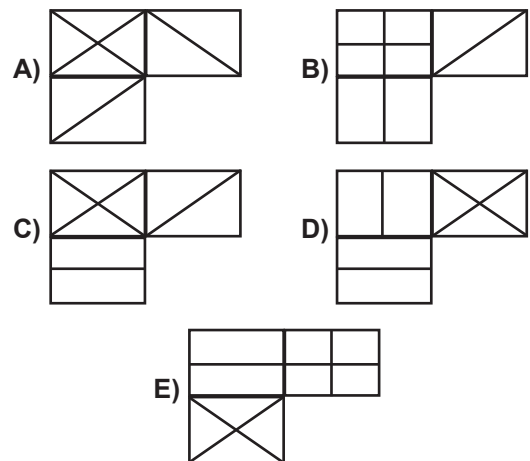
11. If the figures below form a group, which logically is the odd one out?



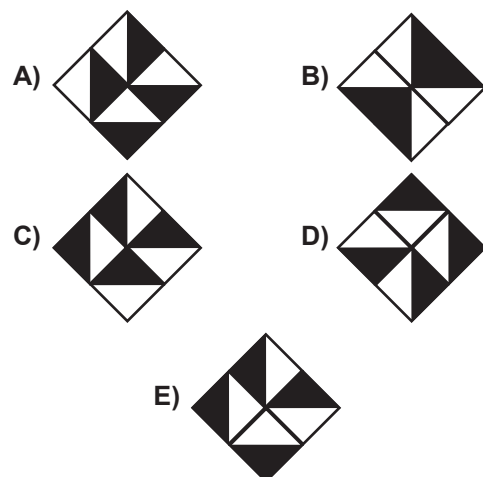
Which figure should replace the question mark (?) ?



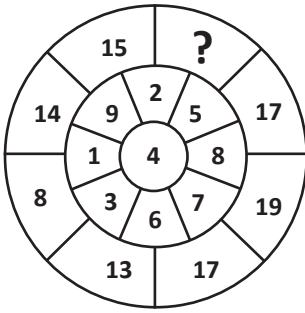
Which figure should replace the question mark (?) ?



Which one of the figures can be formed by rotating the figure above clockwise at an angle of 180°?



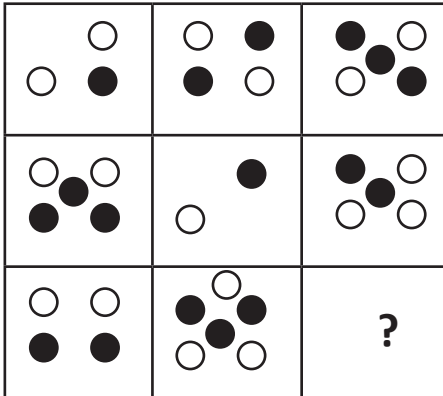
15.



What number should replace the question mark (?) ?

- A) 10    B) 8    C) 16    D) 28    E) 11

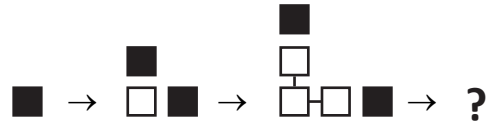
16.



Which figure should replace the question mark (?) ?

- A)    B)   
 C)    D)   
 E)

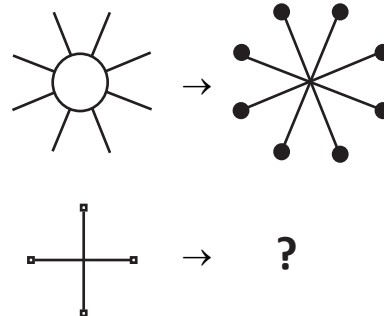
17.



Which figure should replace the question mark (?) ?

- A)    B)   
 C)    D)   
 E)

18.

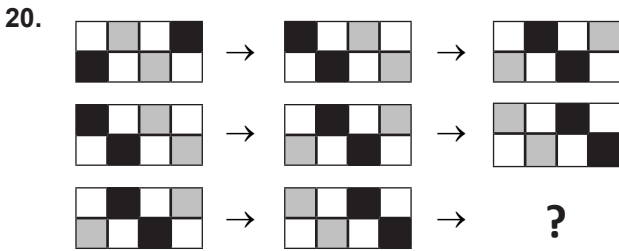
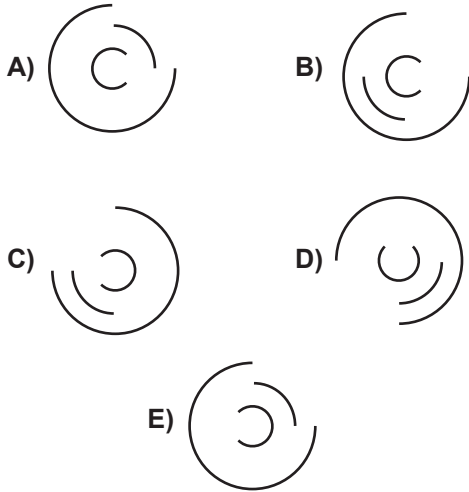


Which figure should replace the question mark (?) ?

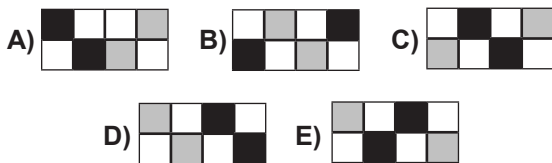
- A)    B)   
 C)    D)   
 E)



Which figure should replace the questions mark (?) ?



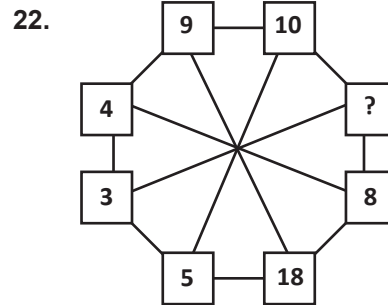
Which figure should replace the question mark (?) ?



21. 458330, 677, 26, 5, ?

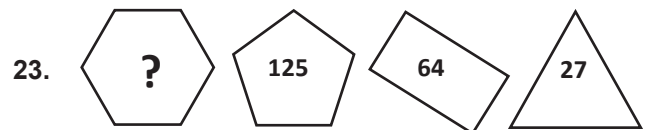
What number should replace the question mark (?) ?

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



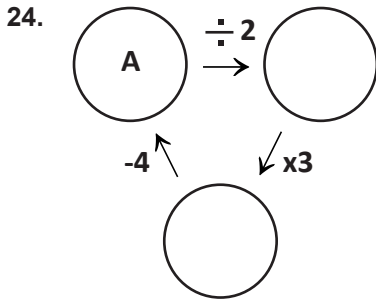
What number should replace the question mark (?) ?

- A) 6    B) 8    C) 9    D) 12    E) 15



What number should replace the question mark (?) ?

- A) 8    B) 243    C) 216    D) 564    E) 196



What number should come in place of (A) in the figure above?

- A) 3    B) 4    C) 5    D) 7    E) 8

25. 9    6    10    7    11    ?    12    9

What number should replace the question mark (?) ?

- A) 12    B) 11    C) 10    D) 9    E) 8

26.

9	9	9
8	7	6
7	6	?

What number should replace the question mark (?) ?

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

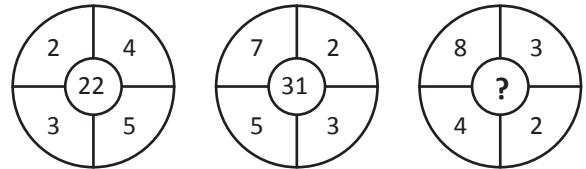
27.

⊕	A	B	C
A		4	
B			8
C	6		

If ⊕ is the addition operation, then  $A \oplus B \oplus C = ?$

- A) 9    B) 12    C) 15    D) 18    E) 21

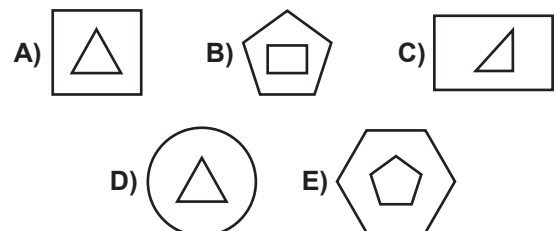
28.



What number should replace the question mark (?) ?

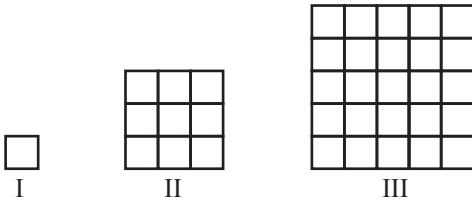
- A) 28    B) 32    C) 36    D) 41    E) 45

29. If the figures below form a group, which logically is the odd one out?





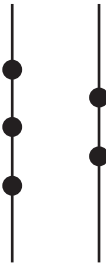
30.



Elements of the sequence above are made up of square units with one-unit long sides. What is the perimeter of the 6th (VI) element?

- A) 36    B) 40    C) 44    D) 52    E) 56

31.



How many triangles can be drawn on the lines above with corners placed on the black dots?

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

32. Below numbers are the codes for BZRU, AWIL, BARI, ZWUL and ZRAW in random order. What is the code for ZWUL?

- A) 6715    B) 1509    C) 3672  
D) 6529    E) 3170

33. ONDOKUZMAYISONDOKUZMAYISONDOKU.....

What is the 174th letter in the sequence above?

- A) N    B) D    C) U    D) A    E) Y

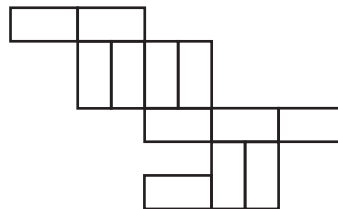
34.



Which figure should replace the question mark (?) ?

- A)    B)   
C)    D)   
E)

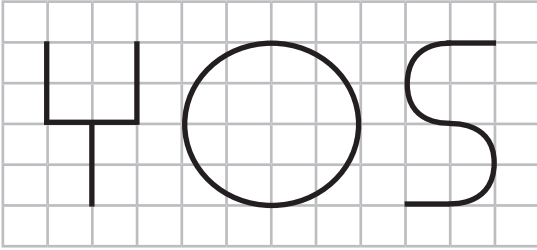
35.



The area of the figure above is 384 m<sup>2</sup>. What is the perimeter of the figure?

- A) 120 m    B) 124 m    C) 144 m  
D) 150 m    E) 169 m

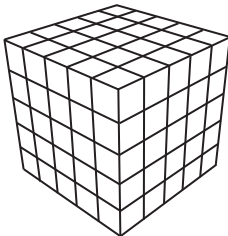
36.



What is the total length of the wire pieces forming the letters above?

- A)  $8 + 6\pi$     B)  $10 + 6\pi$     C)  $10 + 6\pi^2$   
 D)  $10 + 8\pi$     E)  $10 + 5\pi^2$

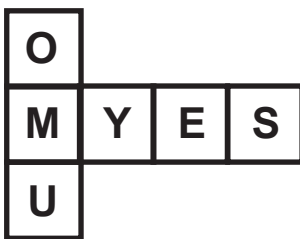
37.



The large cube above is made up of 125 small equal cubes. If the external surface of the large cube is painted in blue, then what is the number of small cubes with two blue faces?

- A) 36    B) 27    C) 24    D) 21    E) 18

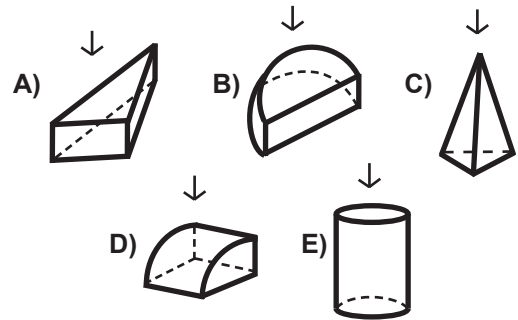
38.



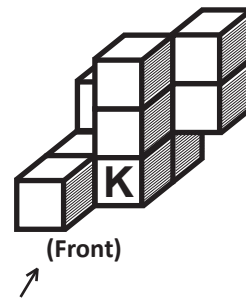
When the figure above is folded to form a cube, which of the following can be produced?

- A)    B)    C)   
 D)    E)

39. Which of the following figures will be seen as a quadrangle when looked from the direction of the arrow (looking down from above) ?



40.



If block K is removed, which of the below figures will be seen in front view?

- A)    B)   
 C)    D)   
 E)





# 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 120 minutes. Candidates are not allowed to leave the examination in the first 30 minutes and the last 15 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 examination 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 to the invigilators during the examination is prohibited. Similarly, it is prohibited for the staff to talk to candidates privately. Candidates are not allowed for exchange of pencils, erasers, papers etc. during the exam.

**4.** 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. 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, exams of all candidates seem to participate in this action will be considered invalid. If invigilators reports any case of misconduct in 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 is engaging 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 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 changing of the booklet from the head invigilator. You should also check if the booklet type written on the cover page is same with 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 booklet types that you have marked and invigilator have marked evaluation will be based on the one that is marked by invigilators.

**8.** Please write your name, surname and passport 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.