Science
Education
Success

OQ KEMA

PM-SCHOOL

GRADE 1 TESTS

SOLUTIONS

PRACTICE TESTS
FOR THE MAIN TOPICS

MONOGRAPH

SOLUTIONS
WITH EXPLANATIONS

50
DIFFERENT
VARIANTS

1. Example:
$x^2 - 5x + 6 = 0$
$(x-2)(x-3) = 0$
$x_1 = 2,\ x_2 = 3$

2. Example:
$a^2 + b^2 = c^2$

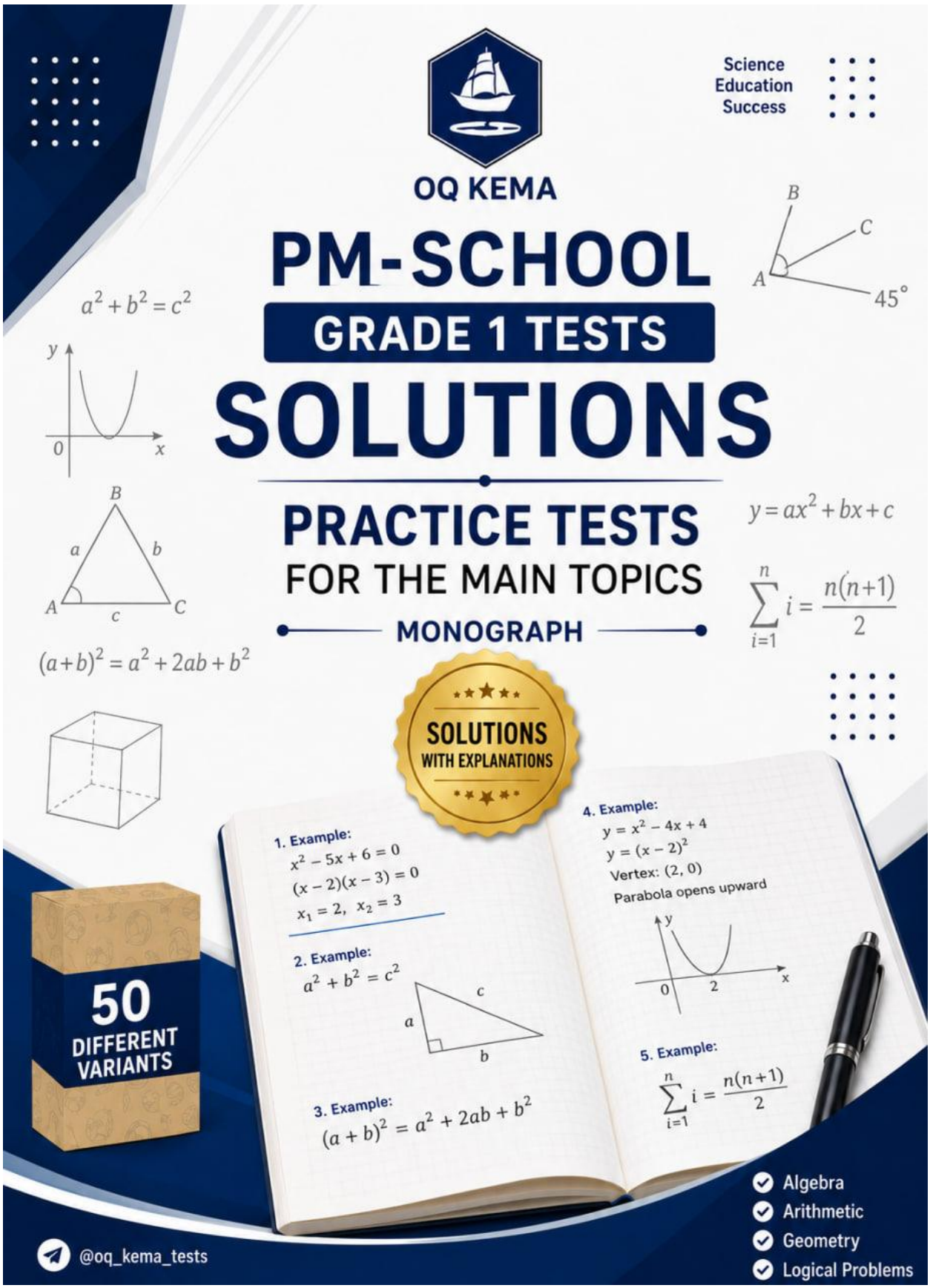
3. Example:
$(a+b)^2 = a^2 + 2ab + b^2$

4. Example:
$y = x^2 - 4x + 4$
$y = (x-2)^2$
Vertex: (2, 0)
Parabola opens upward

5. Example:
$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

- Algebra
- Arithmetic
- Geometry
- Logical Problems

@oq_kema_tests



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Born on March 27, 2007 in the Bogdod district of Fergana region into a family of intellectuals. Currently studying at the Andijan State Pedagogical Institute. Due to his interest in mathematics, he is conducting research on various tests, problems and their solutions. He has participated in international and republican scientific conferences and published scientific articles and theses. He has also been awarded diplomas, certificates and honorary titles of various levels. This monograph contains useful tests and their detailed solutions for students preparing for PM schools.

1ST STAGE TO PM-SCHOOL TEST SOLUTIONS

MONOGRAPHY

Nu"monova Kamolaxon Abdugapir kizi

SOLUTIONS TO THE 1ST STAGE TESTS FOR PM-SCHOOL (Monography)-2026, 80 pages

This monograph is intended for students preparing for general secondary schools and vocational schools and contains solutions to the 1st stage tests in mathematics. The manual pays special attention to developing students' logical thinking, forming skills for quickly and correctly solving problems, and teaching methods for finding solutions to test questions. The monograph includes test tasks of various levels and their detailed solutions on algebra, arithmetic, number theory, equations and inequalities, proportions, percentage problems, functions, elements of combinatorics, and logical problems. Theoretical concepts on each topic are briefly described and reinforced by practical examples. The manual also covers convenient and effective methods of taking tests, short solutions, and quick calculation methods. The tasks provided will help students develop independent work skills, consolidate their knowledge, and thoroughly prepare for the entrance exams to vocational schools. The monograph is recommended as a useful resource for mathematics teachers, applicants, and gifted students.

ENTRANCE

This educational and methodological manual is designed in accordance with the requirements of modern education, especially for students preparing for Presidential schools, and serves to develop their logical thinking skills, form independent analysis skills, and strengthen their ability to solve mathematical problems in depth and systematically. Today, when entering Presidential schools, students are required not only to have theoretical knowledge, but also to have a high level of logical thinking, quick thinking, and the ability to solve problems in various ways. Therefore, this manual was developed based on these needs.

The manual systematically presents mathematical problems of varying complexity, which serve to gradually increase the level of knowledge of students. Each problem is provided with detailed and understandable solutions, which allows students not only to get the answer, but also to deeply understand the solution process. The manual also contains tasks that develop logical thinking, non-standard problems and practical exercises, which help to form a creative approach in students. This, in turn, is of great importance in effectively preparing them for the Presidential School exams.

This manual will also serve as a useful methodological resource for teachers, tutors, and parents. It can be effectively used in the classroom, in independent learning, and in additional activities.

1.1. Understanding of mathematical and logical problems

Mathematical and logical problems are an integral part of the educational process, they determine not only the level of knowledge of students, but also the breadth of thinking. Through mathematical problems, students understand abstract concepts, learn to apply their theoretical knowledge in practice, and develop independent decision-making skills in problem situations.

Logical problems activate the thinking process of students. Through them, important thinking processes such as analysis, synthesis, comparison, generalization, and conclusion are formed and developed. Logical problems are especially important for students preparing for Presidential schools. Because these exams often include tasks that require a non-standard, creative approach. Such problems require students not to use ready-made formulas, but to deeply analyze the situation, consider various solution options, and choose the most optimal method.
Mathematical problems are divided into the following types:

1. Standard questions – based on clear formulas and rules
2. Non-standard issues – require creative thinking
3. Practical issues – related to real-life situations
4. Logical questions are based on thinking and analysis.

Therefore, the process of solving mathematical and logical problems is an important factor in the intellectual development of a student.

1.2. Problem solving methods

There are various methods used to solve mathematical problems. Each method requires a specific approach and is effective for certain types of problems. The main methods are discussed in more detail below:

1. Analysis and synthesis method - This method is considered one of the most important and universal methods. In this methodological method, analysis (analysis) is the study of the problem in parts. Synthesis is the combination of the results obtained and the conclusion.

When solving a problem, first the given and the quantities to be found are determined, and then the relationships between them are studied. This method allows you to break down complex problems into simpler parts.

2. Proportion method – This method is mainly used in matters related to ratios and shares. Proportion is expressed in the following form:

$$\frac{a}{b} = \frac{c}{d}$$

Here, the problem is solved by finding the unknown value. This method is widely used in problems related to trade, speed, work, and interest.

3. Algebraic method – In the algebraic method, a problem is solved by constructing an equation or system of equations. The unknown quantities are denoted by letters and the relationships between them are written in mathematical expressions.

For example: unknown x Define, formulate an equation, and find a solution. This method is especially effective for complex and multi-step problems.

4. Logical Thinking Method - This method emphasizes thinking, guessing, and drawing logical conclusions rather than rigid formulas.

Students analyze the given conditions, identify redundant or hidden information, consider possible options, and arrive at the most appropriate solution.

This method is one of the most common methods used in Presidential School tests.

5. Graphical method – In the graphical method, the problem is solved using a drawing or graph. This method is especially convenient for functions, motion problems, and systems of equations.

For example, by depicting the relationship between two quantities on a coordinate plane, the point of their intersection is found. Deep mastery of problem-solving methods allows students to effectively solve various types of problems. The correct selection and application of each method increases the student's mathematical literacy and thoroughly prepares him for high-level exams, in particular, the Presidential School exams.

Chapter II of this methodological manual presents various types of problems aimed at developing students' skills in applying theoretical knowledge in practice. These problems serve to develop arithmetic, logical and combinatorial thinking. Each task is aimed at developing students' ability to think independently, make quick decisions and approach the problem from different perspectives. Although the problems are presented in a simple form, their solution requires attention, accuracy and logical analysis. This is an important preparatory stage for the Presidential School exams.

Through these practical exercises, students develop their skills in: performing arithmetic operations correctly and quickly, drawing conclusions based on logical thinking, and analyzing time and calendar issues.

These questions also strengthen students' preparation for the various types of tasks that occur in the Presidential School exams. The step-by-step explanation of each solution allows the student to deeply understand not only the result, but also the solution process.

10-variant

1. So that $a = 5, b = 11$ and $c = 7$ if it is equal to, $(a + b) \cdot c - a \cdot b$. Find the value of the expression.

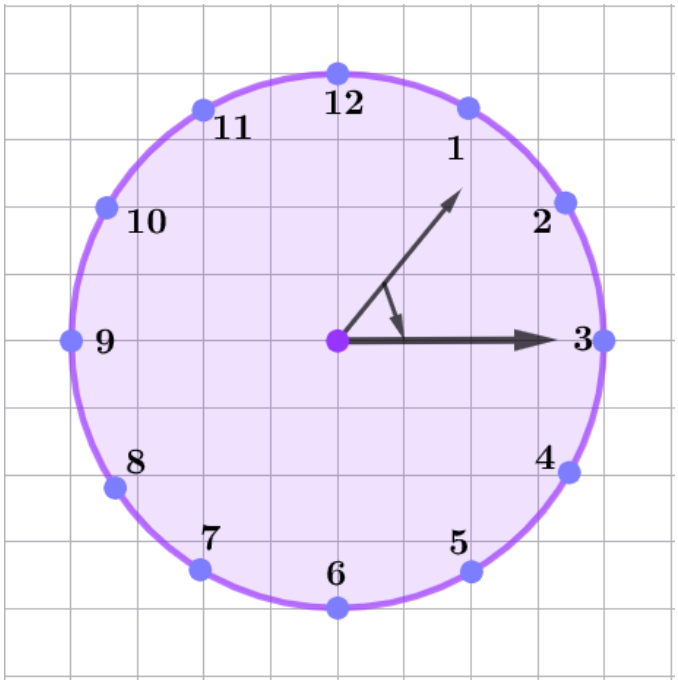
A) 55

B) 57

C) 96

D) 27

2. If the clock is 01: 16, determine how many degrees the angle between the hour and minute hands is.



A)54^0

B) 56^0

C) 58^0

D) 60^0

3. If the first day of the month falls on a Monday, what day of the week does the 21st fall on?

A) Monday

B) Thursday

C) Sunday

D) Saturday

4. The sum of two numbers is as follows:

$$\begin{array}{r} ABC \\ +\ DE \\ \hline 621 \end{array}$$

If the sum includes all the numbers from $1\ to\ 8$, find the value of the expression $(C + E) \cdot A$:

A) 3

B) 4

C) 5

D) 6

5. The surface area of a rectangular field $3m^2$. It is known that. This measurement cm^2. Determine how much it will be.

A) 30

B) 300

C) 3000

D) 30000

6. There are 7 different weights of scales: $7, 8, 17, 20, 30, 33, 35$. When 3 of them are placed on each side of the scale, the scale is balanced. What should be the weight of the seventh extra stone?

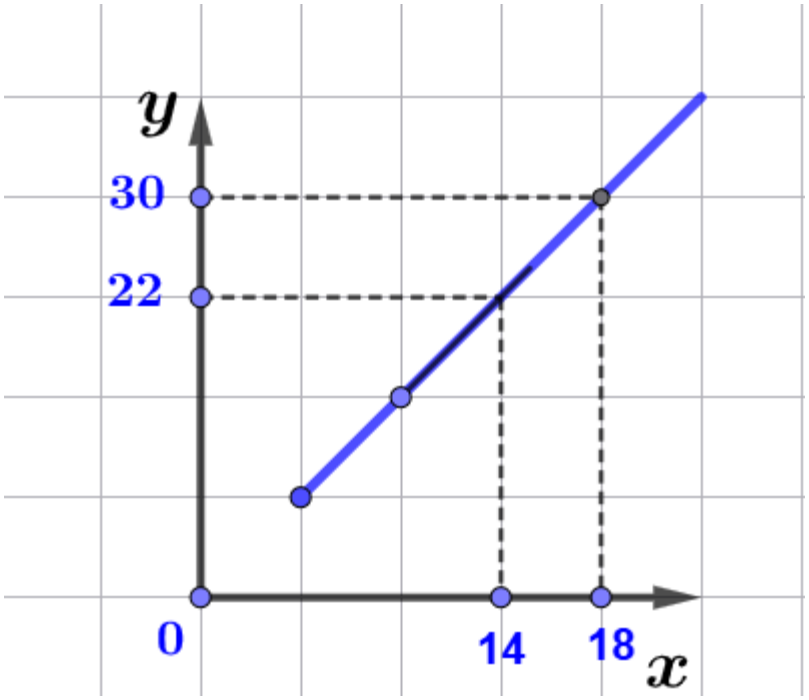
A) 7

B) 30

C) 33

D) 8

7. A straight line is drawn in the coordinate system:



Two points are marked on the line and their coordinates are $(8; p)$ and $(q; 16)$. Determine the value of $p + q$.

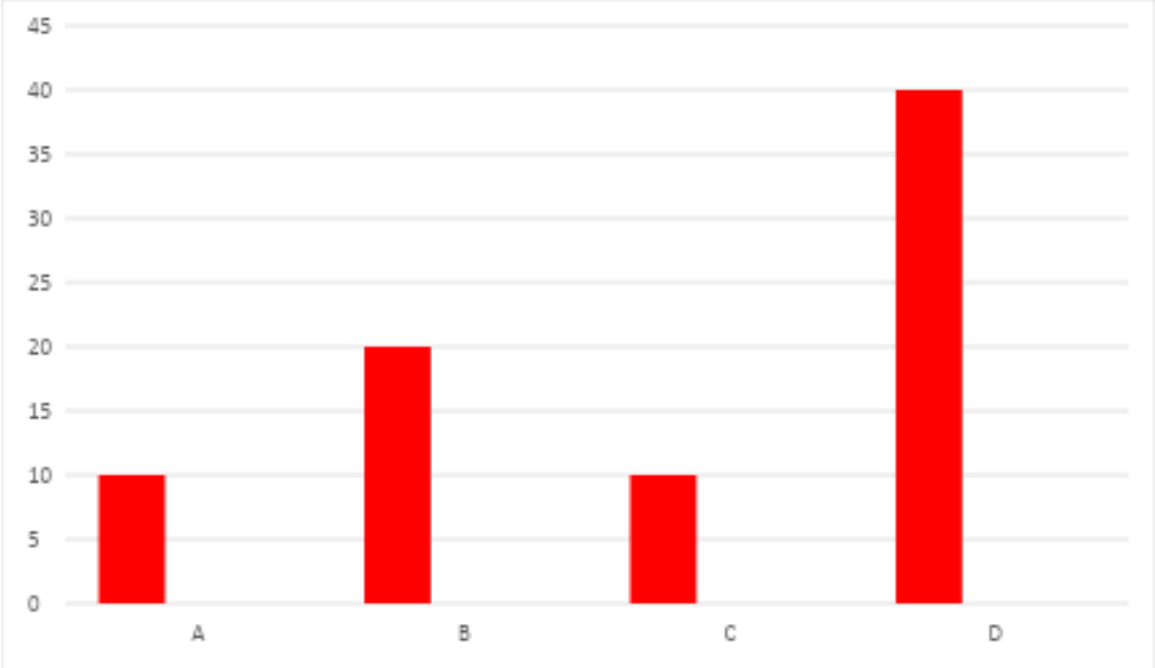
A) 21

B) 23

C) 25

D) 29

8. The number of apartment buildings in villages A, B, C, and D is given in the diagram below:



DETERMINE WHICH ONE OF THE FOLLOWING IS CORRECT.

There are 2 times fewer apartment buildings in village A than in village D.

Village D has as many multi-story houses as villages A, B, and C combined.

Village B has half as many apartment buildings as village A.

A) only I

B) only II

C) only III

D) II and III

9. $(1^2 + 2^2 + \cdots + 10^2)^{2022}$What number does the expression end with?

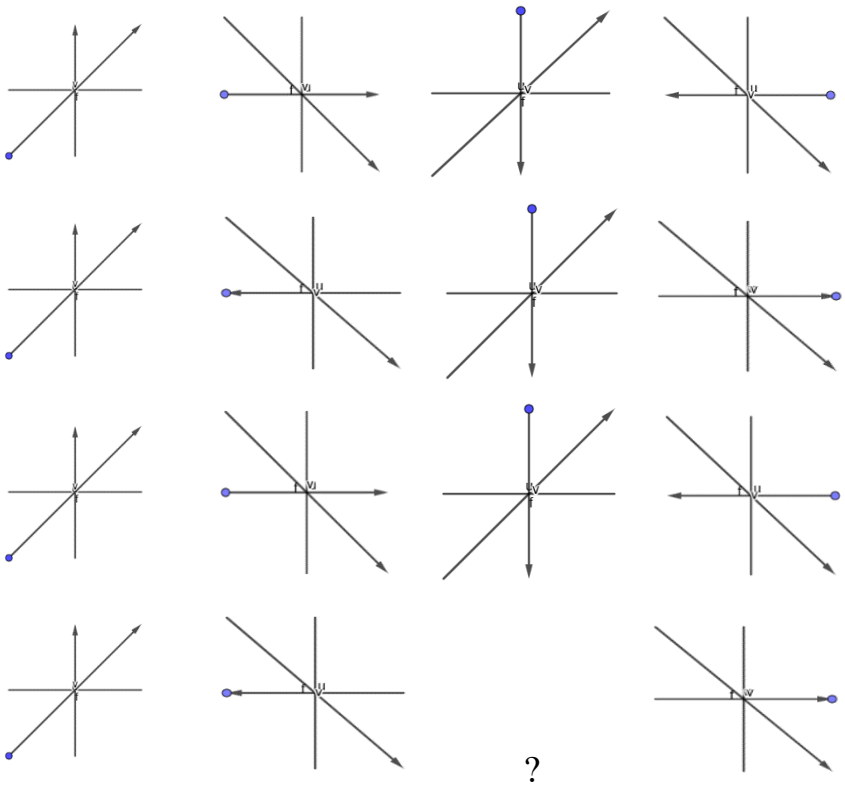
A) 2

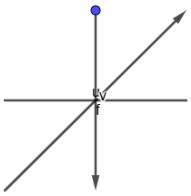
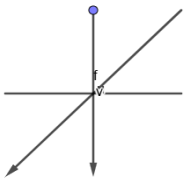
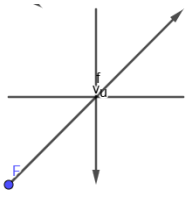
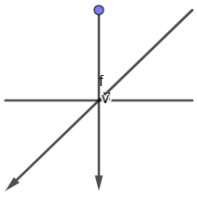
B) 3

C) 5

D) 9

10. Understand the logic and determine the appearance of an unknown shape.



A)  B)  C)  D) 

11. How many three-digit numbers $\overline{abc}$ exist that satisfy the condition . $a > b > c$?

A) 120

B) 100

C) 190

D) 210

12. A customer is shopping at a fabric store. With the money in his hand, the customer can buy 20 cm more fabric at a 10% discount than the regular price. How many cm of fabric can the customer buy at the discounted price with the money in his hand?

A) 200

B) 210

C) 220

D) 250

13. The sum of the current ages of a family consisting of a father, mother, and 2 children is 80. After 5 years, the sum of the ages of the father and mother will be 4 times the sum of the ages of their children. Find the sum of the current ages of the father and mother.

A) 70

B) 36

C) 62

D) 80

14. Two cars with speeds in the ratio 5: 3 started moving simultaneously from point A in opposite directions and reached points C and B after 3 hours. If $BC = 144\ km$, then $AB = ?$

A) 60

B) 54

C) 48

D) 42

15. The factory produced 568 *parts* on the first day, 87 fewer on the second day, and 65 more on the third day. How many parts were produced in total in the factory during these three days?

A) 1595

B) 1585

C) 1605

D) 1575

16. A student bought 6 notebooks and had 100 *soums* left. If he had bought 8 notebooks, he would have owed 300 *soums*. Accordingly, how much does one notebook cost?

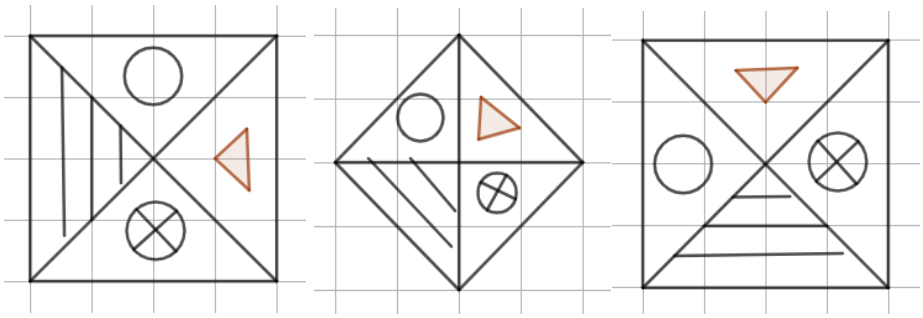
A) 100

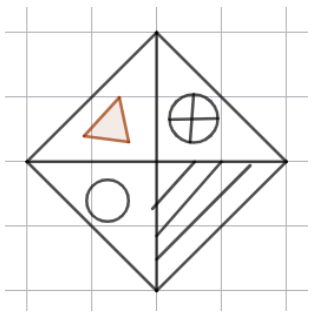
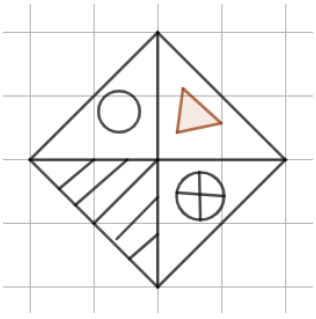
B) 150

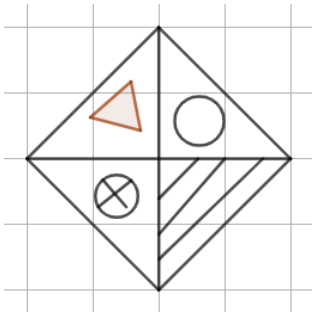
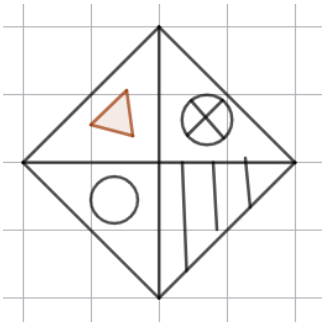
C) 200

D) 400

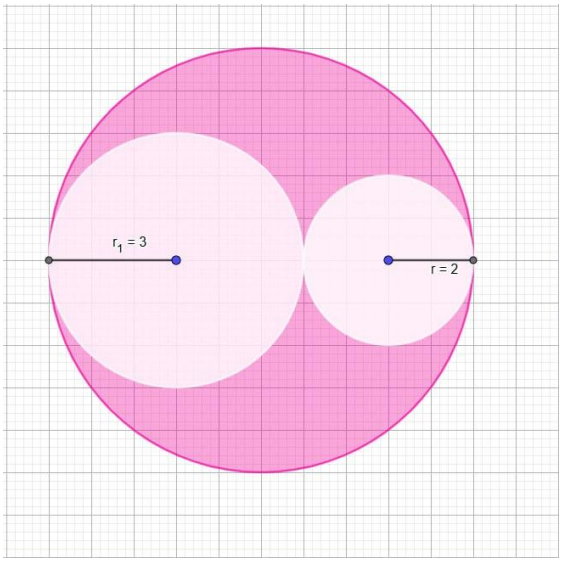
17. Understand the logic and determine the appearance of an unknown shape.



A)  B) 

C)  D) 

18. Circles with radii 2 *and* 3 are external to each other and both are internal to the larger circle (see figure). Find the area of the shaded figure.



A) 12π

B) 13π

C) 14π

D)$15\ \pi$

19. Sanjar burns 10 $calories$ for every 100 $meters$ he walks and 20 $calories$ for every 90 $meters$ he runs. He covered 3 km by walking and running, burning a total of 520 $calories$. So how many meters did Sanjar run?

A) 1800

B) 1200

C) 1500

D) 2100

20. Find the sum of the numbers in parentheses 19 for this sequence.

$$(4; 6), (8; 10; 12), (14,16,18,20), \ldots$$

A) 7020

B) 8020

C) 9624

D) 10240

21. Buses from Ahangaran to Chirchik run every 30 $minutes$. I was driving from Chirchik to Ahangaran when I saw a bus coming into Chirchik. 10 $minutes$ later, another bus passed in front of me. If the bus takes 1 hour to travel between the cities, how much longer will it take me to get to my destination? (minutes)

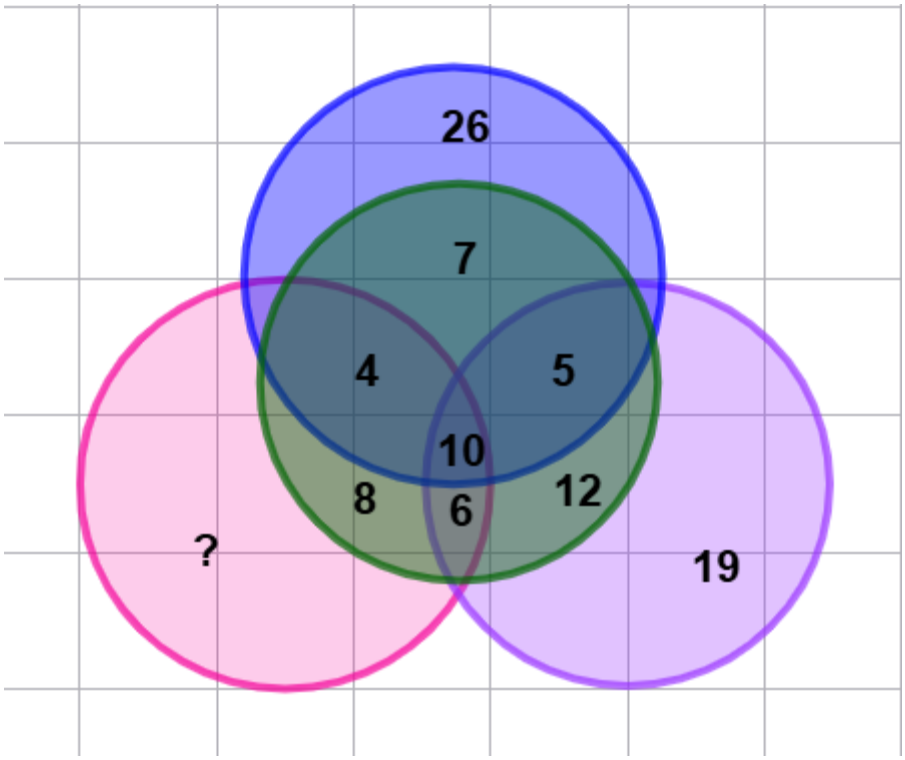
A) 15

B) 20

C) 30

D) 40

22. Find the number that was omitted.



A) 27

B) 24

C) 17

D) 22

23. A father's age is the sum of the ages of his 3 children. The children were born 2 years apart. If the father's current age is 48, how old was the father when his eldest child was born?

A) 35

B) 34

C) 32

D) 30

24. Find the number in the question mark based on the rule below.

$$96\ (16)\ 12; 78\ (12)\ 13; 88\ (\ldots)\ 11$$

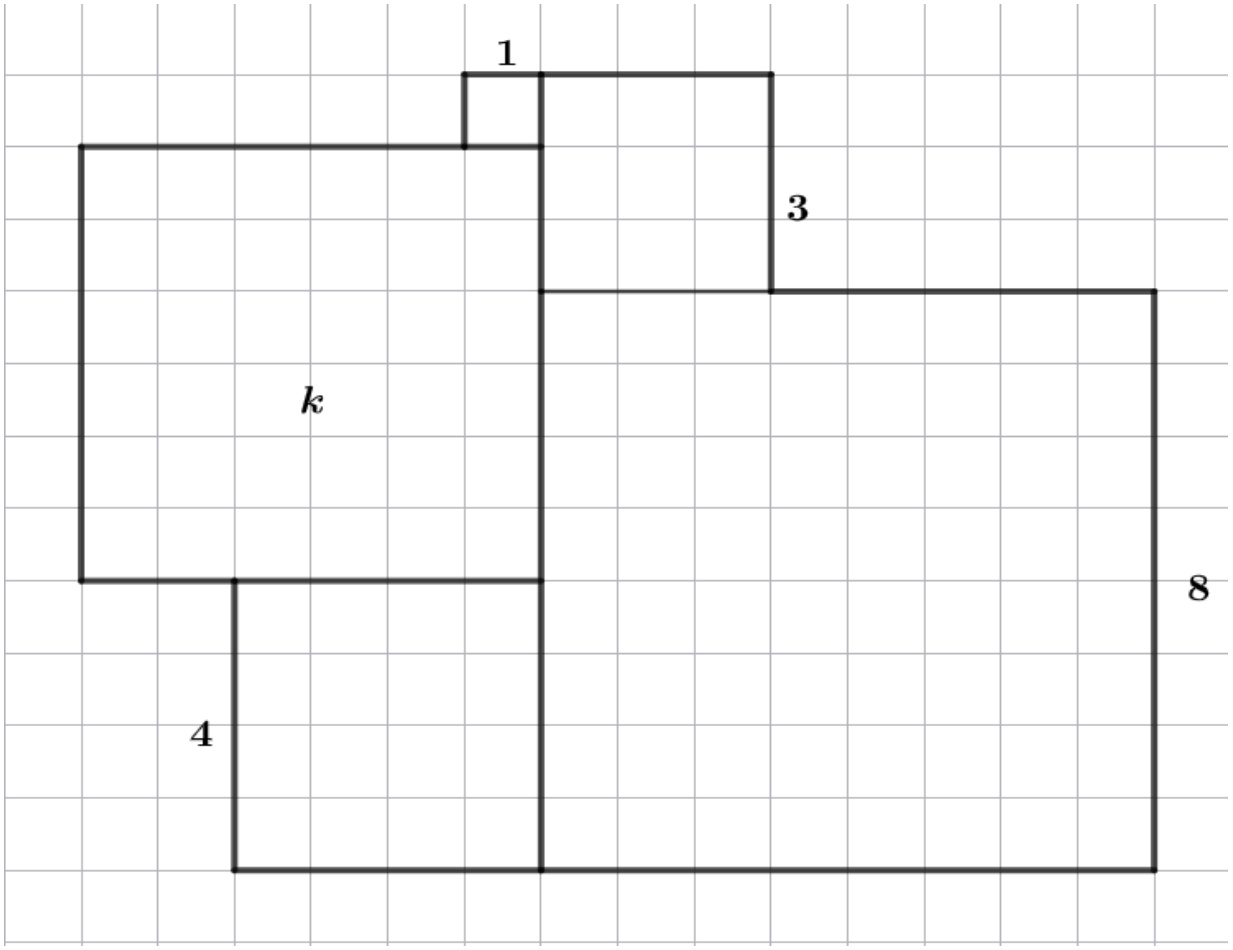
A) 33

B) 8

C) 77

D) 16

25. The figure below shows 5 squares. Find the area of the figure.



A) 64

B) 49

C) 36

D) 25

26.Determine the sum of the digits of the number $101112 \ldots 3940$.

A) 198

B) 199

C) 197

D) 195

27. The age of a father is equal to the sum of the current ages of his four children born 4 years apart. If the father was 42 years old when the oldest child was born, how old is the youngest child now?

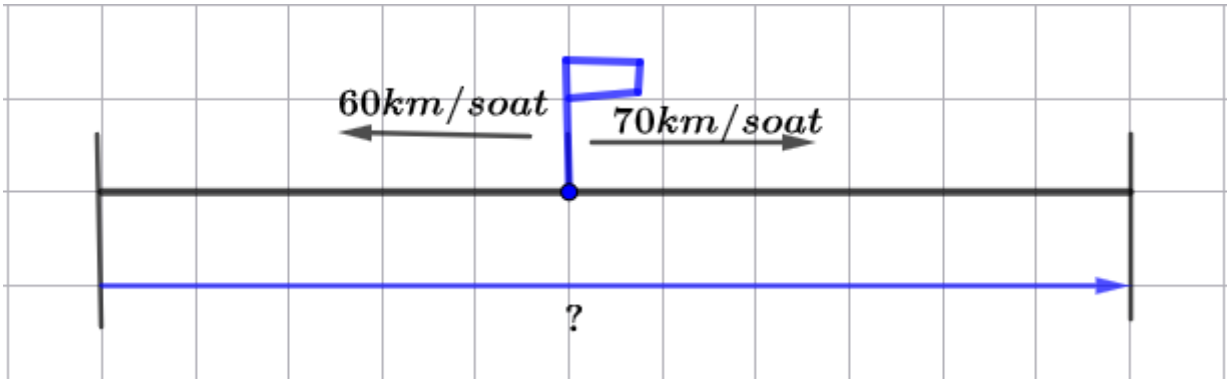
A) 10

B) 12

C) 15

D) 18

28. Two cars leave a gas station at the same time in opposite directions. One of them is traveling at a speed of 60 km/h and the other is traveling at a speed of 70 km/h. How far apart will they be after 3 $hours$?



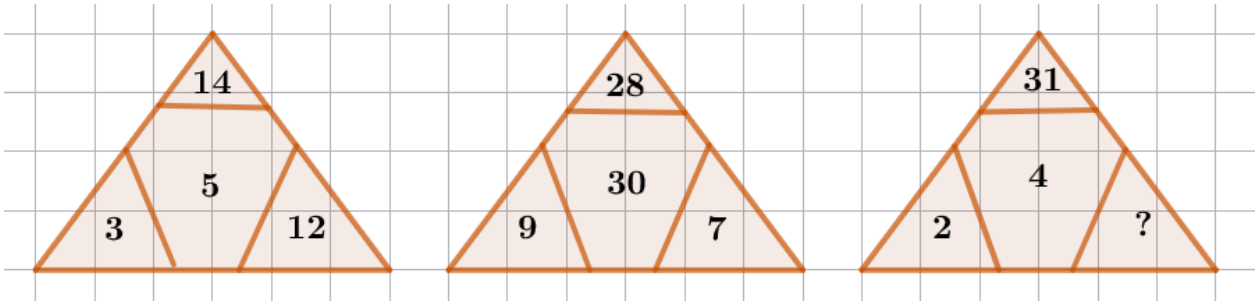
A) 220

B) 180

C) 390

D) 320

29. Which number replaces the question mark?



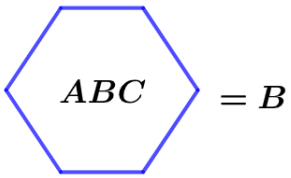
A) 16

B) 23

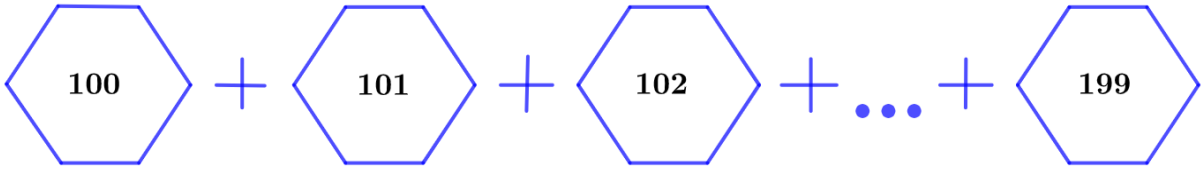
C) 29

D) 35

30. The following correspondence is given for the 3-digit number ABC:



Then find the value of the sum below.



A) 450

B) 300

C) 250

D) 600

Test methods and answer key.

1. If $a = 5, b = 11$ *and* $c = 7$, find the value of the expression $(a + b) \cdot c - a \cdot b$.

Method 1: Direct evaluation method

Solution: The given expression involves variables. In such cases, one of the simplest and most convenient methods is to evaluate the expression by substituting their

values for the variables. First, we substitute each variable in the expression with its value $(a+b)\cdot c-a\cdot b$

In the next step, following the order of operations, we first calculate the sum inside the parentheses,

$$(5+11)\cdot 7-5\cdot 11=16\cdot 7-5\cdot 11=112-55=57$$

Method 2: Simplifying the expression (algebraic transformations) method

Solution: $(a+b)\cdot c-a\cdot b$ In this method, we simplify the expression algebraically before directly assigning values. To do this, we use the methods of opening parentheses and grouping common terms.

$$(a+b)\cdot c-a\cdot b=a\cdot c+b\cdot c-a\cdot b=a\cdot(c-b)+b\cdot c$$
$$=b\cdot(c-a)+a\cdot c$$

We have several simplifications, we will try each one.

We put this $(a+b)\cdot c-a\cdot b=a\cdot c+b\cdot c-a\cdot b$ into the equation:

$$(a+b)\cdot c-a\cdot b=a\cdot c+b\cdot c-a\cdot b=5\cdot 7+11\cdot 7-5\cdot 11$$
$$=35+77-55=57$$

To simplify in different ways, this expression can be written in several ways:

$$(a+b)\cdot c-a\cdot b=a\cdot(c-b)+b\cdot c\ .$$

We put this into the equation:

$$(a+b)\cdot c-a\cdot b=a\cdot(c-b)+b\cdot c=5\cdot(7-11)+11\cdot 7=$$
$$=5\cdot(-3)+77=-15+77=57$$

These transformations are algebraically equivalent, and each of them yields the same result.

Checking by substituting values

We substitute $(a+b)\cdot c-a\cdot b=b\cdot(c-a)+a\cdot c$ into the equation:

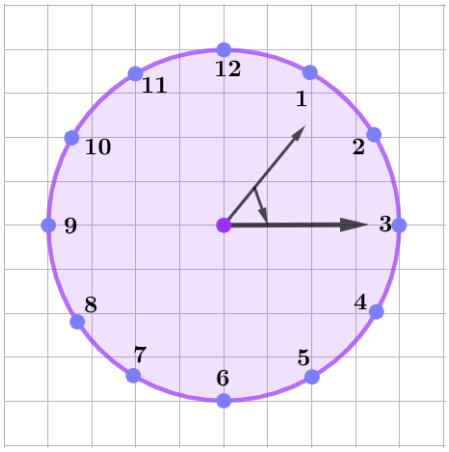
$$(a+b)\cdot c-a\cdot b=b\cdot(c-a)+a\cdot c=11\cdot(7-5)+5\cdot 7=22+35=57$$

Answer: 57

These methods are important in developing algebraic thinking in students. In particular, the following skills are formed: reducing expressions to different equivalent forms, using the method of separating (grouping) the general term,

understanding the possibility of solving a problem in several ways, choosing the most convenient and fastest solution. This approach also provides students with a deeper understanding of mathematical expressions and a solid foundation for solving complex algebraic problems in the future. The method of solving by simplifying the expression not only facilitates calculations, but also develops the student's logical and analytical thinking. Students are advised to compare different methods and choose the one that is most convenient for them. As you can see, our answers are correct in every case. You can use the method that is convenient for you.

2. If the hanging clock $01:16$ .If so, determine how many degrees the angle between the hour and minute hands is.



Solution: This problem is based on the concepts of time and angle. Since the movements on a clock face occur in a circle, 360° is considered a complete rotation.

Step 1:We can calculate how many degrees the hour hand moves in 1 minute.

$\frac{360^0}{12soat} = 30^0$thisin an hour$30^0$gives a turn to.

Step 2:We$\frac{30^0}{1soat} = \frac{30^0}{60minut} = 0.5^0$ so in a minute 0.5^0 is converted to. We thus construct the following proportion:

$$1min \to 0.5^0$$

$$16min \to x^0$$

$$x^0 = \frac{16min \cdot 0.5^0}{1min} = 8^0$$

So, the clock is one minute off.0.5^0turns to. And in 16 minutes8^0ga teng.

Now we calculate how many degrees the minute hand will turn.

$$\frac{360^0}{60min} = 6^0$$

So,$16min \cdot 6^0 = 96^0$, in an hour30^0, and in 16 minutes8^0ga teng.

We perform this operation because we are asked for the angle between the hour and minute miles.

$$96^0 - 30^0 - 8^0 = 58^0$$

Answer: 58^0

This problem serves to develop the following knowledge and skills in students: practical application of the concepts of circle and angle, conversion of time units into angles, understanding proportional relationships, solving a complex problem through step-by-step analysis. Especially often, this type of problem occurs in the Presidential School exams and requires students not only to know the formula, but also to apply it correctly and maintain logical consistency. It is also advisable for the teacher to provide a visual explanation using a clock model or drawing when explaining this topic, as this will further develop the students' ability to imagine.

3. If the first day of the month falls on a Monday, what day of the week does the $21st$ fall on?

1-proposal: Table (visual) method

Solution: This problem is aimed at determining the relationship between the days of the week and dates. The method of creating a table is very convenient and understandable for solving problems of this type. Through this method, the student can arrange the dates in a row and clearly see that they correspond to the days of the week.

Below is a table showing the first 28 days of the month:

	Weekdays						
	Monday	Tuesday	Wednesday	Thursday	week	Saturday	Sunday
1-week	1	2	3	4	5	6	7

2 week	8	9	10	11	12	13	14
3- week	15	16	17	18	19	20	21
4- week	22	23	24	25	26	27	28

At the beginning of the month, the 1st date falls on Monday. Each subsequent date corresponds to the next day of the week. When the $7-day$ period ends, the days of the week repeat again. As can be seen from the table:

The $7th$ date is Sunday,

The $14th$ date is Sunday,

The $21st$ date is also Sunday.

Answer: Sunday

The table method is one of the most effective methods for primary and secondary school students. Through this method: students visually understand the concepts of time and date, easily understand sequence and periodicity $(7-day\ cycle)$, analyze logical connections visually.

This method is especially important for students preparing for Presidential schools at the initial stage, and later it is recommended that they switch to solving similar problems in a rapid (calculation) method.

2-proposal.

Solution:

A week consists of $7\ days$. Therefore, we divide the $21st$ date by the day of the week. If there is a remainder, we count from the first day of the week and get the answer. If there is no remainder, the answer is the last day of the week.

Answer: Sunday

4. The sum of two numbers is as follows:

$$\begin{array}{r} ABC \\ +\ DE \\ \hline 621 \end{array}$$

If all numbers from 1 to 8 are present in the sum,$(C + E) \cdot A$. Find the value of the expression:

Solution:

Equation: $ABC + DE = 621$.

Numbers: A, B, C, D, E numbers and $6, 2, 1$The numbers must together cover all the numbers from 1 to 8. That is, $1, 2, 3, 4, 5, 6, 7, 8$. The numbers are used only once. The logical solution is as follows:

A : In the hundreds place, $A + (removal) = 6$ must be. If $A = 6$, there is no removal from the tens place. In this case, there must be a sum of tens, which is impossible with all the numbers from 1 to 8 $(1 + 1 \neq 2)$. Therefore, $A = 5$ must be, and there was 1 removal from the tens place.

The definition of B, C, D, E is as follows: Given that $A = 5$, the remaining numbers must be from the set {1,2,3,4,6,7,8}. The only logical combination for the equation to be correct and for all numbers to be used is found:

In the ones place: $C + E = 11$ (with 1 removal).

In the tens place: $B + D + 1(removal) = 12$ (with 1 removal). So, $B + D = 11$.

Check the numbers: There is a combination that meets the above conditions and uses all the numbers:

$$A = 5$$

$$C = 8, E = 3\ (8 + 3 = 11)$$

$$B = 4, D = 7\ (4 + 7 = 11)$$

Check: $548 + 73 = 621$. The numbers used are: {5,4,8,7,3,6,2,1}. All the numbers from 1 to 8 were used.

The problem is to find the value of the expression $(\boldsymbol{C + E}) - \boldsymbol{A}$**:**

$$(C + E) - A = (8 + 3) - 5 = 6$$

Answer:6

5. It is known that the area of a rectangular area is 3 m^2. Find the area of this measurement in cm^2

Solution:

Before we can work on this example, we need to know the units of length and area.

$$1m = 10^2 cm$$

$$1m^2 = 10^4 cm^2$$

Since we have these equalities, we will work this example using proportion.

$$1m^2 \rightarrow 10000cm^2$$

$$3m^2 \rightarrow xcm^2$$

$$xcm^2 = \frac{3m^2 \cdot 10000cm^2}{1m^2} = 30000cm^2$$

Answer: $30000cm^2$

6. There are 7 different weights of scales: $7, 8, 17, 20, 30, 33, 35$. When 3 of them are placed on each side of the scale, the scale is balanced. What should be the weight of the seventh extra stone?

Solution:

We calculate the total weight: $7 + 8 + 17 + 20 + 30 + 33 + 35 = 150$.

The scale needs to be balanced as asked in the question. Condition for balance: The weights of the stones on both sides of the scale must be equal. This means that the total weight of the 6 stones used must be an even number (because the weight of one side cannot be odd, and the weight of the second side cannot be an even value).

We find the remaining stone: Total weight (150) is an even number. In order for the sum of the 6 stones used to be even, the $7th$ stone that remains must also be an even number. We have even numbers: 8,20,30.

It is convenient to find the answer by checking the options, so we check the even values in the answers as the $7th$ stone.

We need to check the options $B(30)\ and\ D(8)$.

If we take the option 30:$150 - 30 = 120$

$$120 : 2 = 60$$

There should be 60 in each phase.

To generate 60:

$35 + 17 + 8 = 60$ and $33 + 20 + 7 = 60$.

So, the seventh stone that was left over**30**It was determined by examining option B that it is heavy.

Let's also check option D.

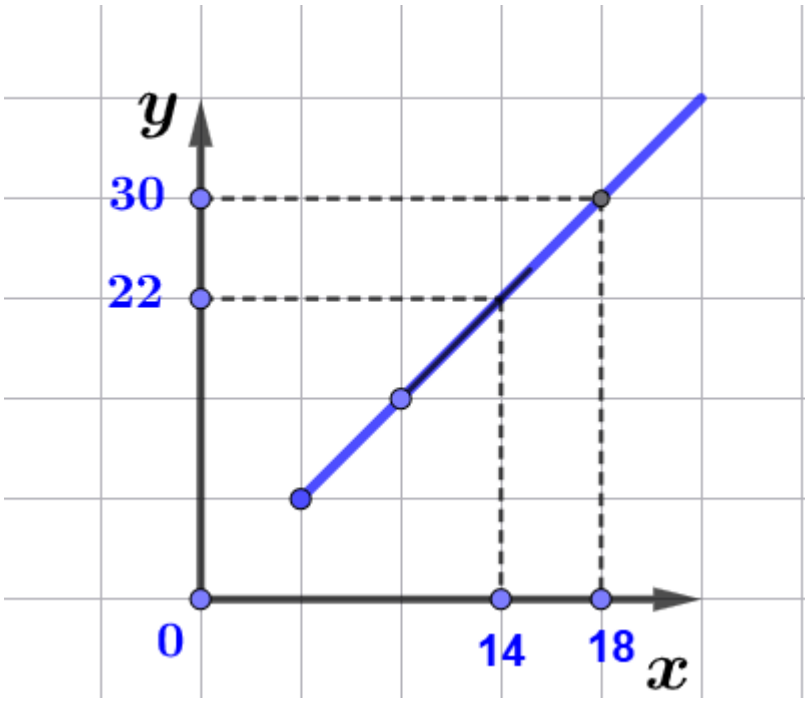
$$150 - 8 = 142$$

$$142 : 2 = 71$$

Each round should be 71, but we do not accept this answer because it does not meet the above condition.

Answer: 30

7. A straight line is drawn in the coordinate system:



Two points are marked on the line and their coordinates are $(8; p)$ and $(q; 16)$. Determine the value of $p + q$.

Solution: We use the equation of a straight line. That is, we work through the formula $y = kx + b$.

Through the points $(14; 22)$ and $(18; 30)$ we can find k and b from the equation

$$-\begin{cases} 30 = 18k + b \\ 22 = 14k + b \end{cases}$$

$$30 - 22 = 18k + b - 14k - b$$

$$8 = 4k$$

$$k = 2$$

Using $k = 2$, we can find b by substituting the value of the expression into any equation.

$$30 = 18 \cdot 2 + b$$

$$30 - 36 = b$$

$$b = -6$$

By also finding $b = -6$, a new equation is formed using this equation $y = kx + b$. The equation is as follows: $y = 2x - 6$

Now the next step is to find the values of the points $(8; p)$ and $(q; 16)$.

$y = 2x - 6$ We put the point $(8; p)$ in this equation and find the value of p.

$$p = 2 \cdot 8 - 6 \rightarrow p = 10$$

$y = 2x - 6$ We put the point (q;16) in this equation and find the value of q.

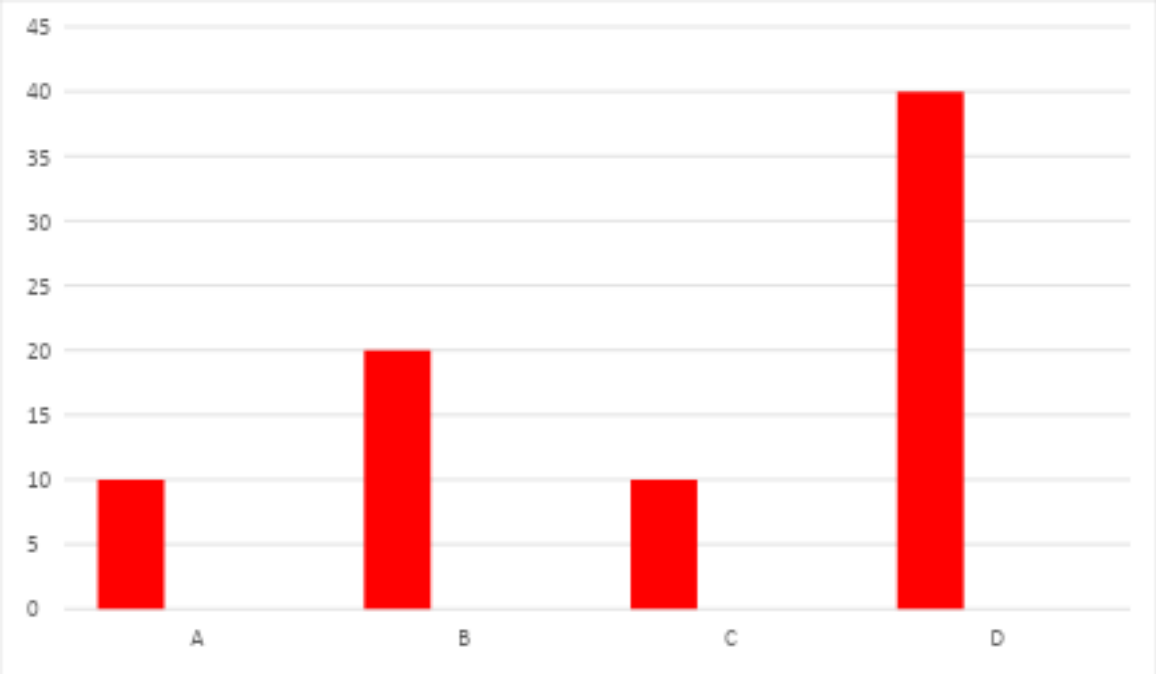
$$16 = 2 \cdot q - 6 \rightarrow 22 = 2q \rightarrow q = 11$$

$$It\ was\ found\ that\ p = 10, q = 11.$$

$$p + q = 10 + 11 = 21$$

Answer: 21

8. The number of apartment buildings in villages A, B, C, and D is given in the diagram below:



DETERMINE WHICH ONE OF THE FOLLOWING IS CORRECT.

1. There are 2 times fewer apartment buildings in village A than in village D.
2. Village D has as many multi-story houses as villages $A, B, and\ C$ combined.
3. Village B has half as many apartment buildings as village A.

Solution:

$A = 10, B = 20, C = 10, D = 40$ are the number of apartment buildings. Now, using the information, we will check whether these analyses are correct or incorrect. There are 10 houses in village A, and there are 40 houses in village D. We were told that $2 \cdot A = D$ should be in the form. However, this equality is incorrect according to the above sentence, as follows: $2 \cdot 10 \neq 40$.

If this equality is satisfied, the answer is correct, if not, it is incorrect:

$$D = A + B + C$$

$$40 = 10 + 20 + 10$$

$$40 = 40$$

so, this equation is true. If this equation is true, the answer is true, if it is not true, it is an error:

$$B = 2 \cdot A$$

$$20 = 2 \cdot 10$$

So, this equation is also true.

Answer: II and III

9. $(1^2 + 2^2 + \cdots + 10^2)^{2022}$ What number does the expression end with?

Solution:

First,$1^2 + 2^2 + \cdots + 10^2$We can calculate this expression. We use the formula to calculate this expression: $1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$

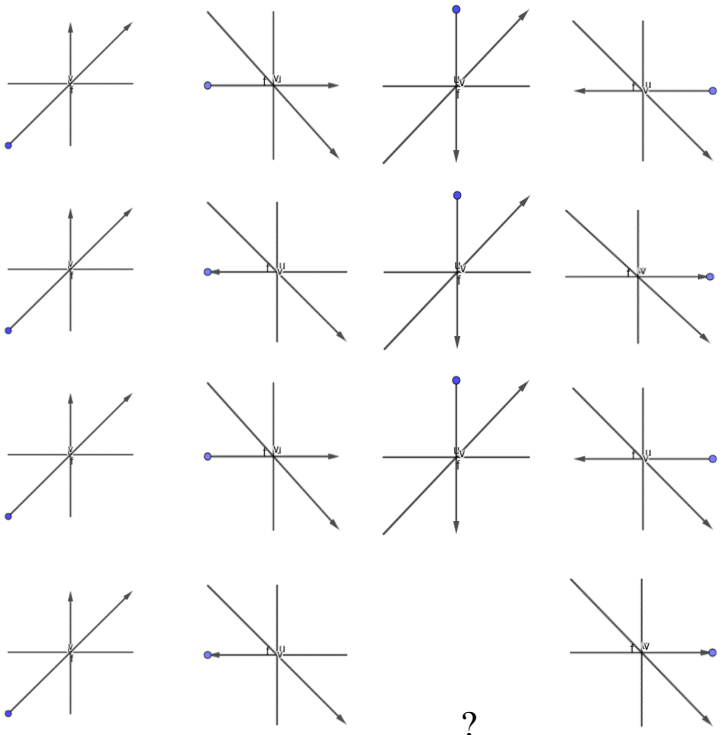
$$1^2 + 2^2 + \cdots + 10^2 = \frac{10(10+1)(2 \cdot 10+1)}{6} = \frac{10 \cdot 11 \cdot 21}{6} = 35 \cdot 11 = 385$$

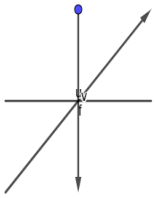
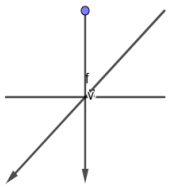
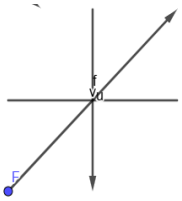
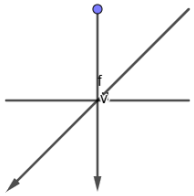
Now let's calculate what number ends in the 2022 power of 385.

We know that any power of 5 ends in 5, using this law, we can find that the last digit of 385^{2022} ends in 5.

Answer: 5

10. Understand the logic and determine the appearance of an unknown shape.



A)  B)  C)  D) 

Solution:

This logical example is very simple to solve, the main thing is to see the connection between the rows. Let's analyze it step by step:

1. Determine the repetition of the rows. If you look carefully at the table, you will see that the shapes in it are repeated in a certain order: Row 1 and Row 3: All the shapes in these two rows are the same and in the same order. Row 2 and Row 4: These rows must also match each other. That is, the shapes in row 4 must be exactly the same as the shapes in row 2.

2. Find the position of the question mark. The question mark is in column 2 of row 4. According to the rule above, it must be the same as the shape in column 2 of row 2.

3. Compare the shapes. Let's look at the shapes in row 2:

1. First shape: Vertical line and diagonal slanting to the left (/)

2. Second shape (the one we need): Vertical line and diagonal slanting to the right (\)
3. Third shape: Horizontal line and diagonal slanting to the left.
4. Fourth shape: Horizontal line and diagonal slanting to the right.
5. So, instead of the question mark, there should be a vertical line and diagonal slanting to the right (\).

4. Choose an answer. Let's look at the options:

A)A vertical line and a diagonal that deviates to the right —**This is the shape we are looking for.**

B) A vertical line and a diagonal that deviates to the left.

C) A horizontal line and a diagonal that deviates to the right.

D) Full cross shape.

Answer:A

11. How many $a > b > c$ three-digit numbers are there that satisfy the condition $\overline{abc}$?

Solution: In order for ¯abc to satisfy the condition a, the largest value is assigned to a. Note that $a \neq 0$ is required for a 3-digit number.The digits $a > b > c$ must be different from each other due to this condition. We have the following sets to generate 3-digit numbers. {0,1,2,3,4,5,6,7,8,9}There are a total of 10 numbers in this set to choose from. If we choose any 3 of these 10 numbers, they can be arranged in exactly one way to satisfy the condition $a > b > c$ (it is enough to represent the largest by a, the middle by b, and the smallest by c).

$$\left.\begin{matrix}9&8&7\\9&8&6\\9&8&5\\9&8&4\\9&8&3\\9&8&2\\9&8&1\\9&8&0\end{matrix}\right\}8\,ta,\quad \left.\begin{matrix}9&7&6\\9&7&5\\9&7&4\\9&7&3\\9&7&2\\9&7&1\\9&7&0\end{matrix}\right\}7\,ta,\quad \left.\begin{matrix}9&6&5\\9&6&4\\9&6&3\\9&6&2\\9&6&1\\9&6&0\end{matrix}\right\}6\,ta,\quad \left.\begin{matrix}9&5&4\\9&5&3\\9&5&2\\9&5&1\\9&5&0\end{matrix}\right\}5\,ta,$$

$$\left.\begin{matrix}9&4&3\\9&4&2\\9&4&1\\9&4&0\end{matrix}\right\}4\,ta,\quad \left.\begin{matrix}9&3&2\\9&3&1\\9&3&0\end{matrix}\right\}3ta,\quad \left.\begin{matrix}9&2&1\\9&2&0\end{matrix}\right\}2\,ta,\quad 9\quad 1\quad 0\}1ta.$$

We have only seen the case of 9 in the first place. The remaining 3-digit numbers also go in the same order. That is, by putting the numbers 9,8,7,6,5,4,3,2 in the first place, we can find how many three-digit numbers satisfy this condition $a > b > c$. In this way, we have established this identity. $(1 + 2 + 3{+}\ldots{+}7 + 8)$ Through this sum, we can know how many 3-digit numbers starting with 9, $a > b > c$ satisfy this condition. The rest decrease by one.$(1 + 2 + 3 + \cdots + 7 + 8)$ This sum is very convenient and efficient to work with the following formula.

$$(1 + 2 + 3 + \cdots + n) = \frac{1+n}{2} \cdot n$$

$$(1 + 2 + 3{+}\ldots{+}7 + 8) = \frac{1+8}{2} \cdot 8 = 9 \cdot 4 = 36$$

$$(1 + 2 + 3 + \cdots + 7 + 8) + (1 + 2 + 3 + \cdots + 6 + 7) + (1 + 2 + 3 + \cdots + 6) +$$

$$+(1 + 2 + 3 + 4 + 5) + +(1 + 2 + 3 + 4) + (1 + 2 + 3) + (1 + 2) + 1 =$$

$$= \frac{1+8}{2} \cdot 8 + \frac{1+7}{2} \cdot 7 + \frac{1+6}{2} \cdot 6 + \frac{1+5}{2} \cdot 5 +$$

$$+\frac{1+4}{2} \cdot 4 + \frac{1+3}{2} \cdot 3 + \frac{1+2}{2} \cdot 2 + 1 =$$

$$= 36 + 28 + 21 + 15 + 10 + 6 + 4 = 120$$

Answer: 120

12. A customer is shopping at a fabric store. With the money in his hand, the customer can buy $20\,cm$ more fabric than the regular price at a 10% discount. How many cm of fabric can the customer buy with the money in his hand at the discounted price?

Solution: Imagine that you have a certain amount of money. The amount of money does not change. The shopkeeper has announced a 10% discount on the fabric. At the non-discounted price: you get $Q\ cm$ of fabric for your money. At the discounted price: you get $Q'\ cm$ of fabric for your money.

Since there is a discount, Q' is larger, or rather, the quantity Q' is 20 cm more than the quantity Q. ($Q' = Q + 20$).

The relationship between price and quantity is as follows: quantity of money (M), constant price (P), quantity (Q). $M = P \cdot Q$

The discounted price is 90% of the original price $(P' = 0.9 \cdot P)$.

Therefore, we have 2 equations.

$$P \cdot Q = 0.9P \cdot Q'$$

$$Q = 0.9 \cdot Q'$$

$$Q = 0.9 \cdot (Q + 20)$$

$$Q = 0.9Q + 0.9 \cdot 20$$

$$Q - 0.9Q = 18$$

$$0.1Q = 18$$

$$Q = 180cm$$

Since we were asked how much fabric we could get at a discounted price,$Q' = Q + 20$We need to find this expression.

$$Q' = Q + 20 = 180 + 20 = 200cm$$

Answer: 200cm

13. The sum of the current ages of a family consisting of a father, mother, and 2 children is 80. After 5 $years$, the sum of the ages of the father and mother will be 4 $times$ the sum of the ages of their children. Find the sum of the current ages of the father and mother.

Solution:

We can conveniently mark the given numbers.

$$\left.\begin{array}{c}\text{father} \to x \\ \text{mother} \to y \\ \text{older child} \to \text{z} \\ \text{smal child} \to \text{t}\end{array}\right\} current\ age\ 80\ years,$$

$$\left.\begin{array}{c}\text{father} \to x+5 \\ \text{mother} \to y+5 \\ \text{older child} \to \text{z}+5 \\ \text{smal child} \to \text{t}+5\end{array}\right\} After\ 5\ years$$

$$x + y = ?$$

So, $x + y + z + t = 80$ (equation 1) the sum of the current ages of this family is 80. We need to use this to calculate the sum of the current ages of the father and mother. Therefore, $x + y + z + t = 80$ from this equation

$x + y = 80 - z - t = 80 - (z + t)$ we get the following equation.

After 5 years the sum of the ages of the father and mother will be 4 times greater than the sum of the ages of their children. That is $(x + 5 + y + 5) = 4 \cdot (z + 5 + t + 5)$ (equation 2)

Now we put equation 1 into equation 2.

$$(x + 5 + y + 5) = 4 \cdot (z + 5 + t + 5)$$

$$(x + y + 10) = 4 \cdot (z + t + 10),$$

$$x + y = 80 - z - t$$

$$(80 - z - t + 10) = 4z + 4t + 40$$

$$90 - z - t = 4z + 4t + 40$$

$$90 - 40 = 4z + z + 4t + t$$

$$50 = 5(z + t)$$

$$z + t = 10$$

In the final part we $x + y = 80 - z - t = 80 - (z + t)$. We need to calculate this expression.

$$x + y = 80 - z - t = 80 - (z + t) = 80 - 10 = 70$$

Answer: 70 years old

14. Two cars with speeds in the ratio of 5: 3 started moving simultaneously from point A in opposite directions and reached points C and B after 3 hours. If $BC = 144\ km$, then $AB = ?$

Solution:

Let the speeds be $v_1 = 5k$ and $v_2 = 3k$. Time $t = 3$ hours.

$$S_2 = AB = ?$$

Distance formula: $S = v \cdot t$

The first car traveled a distance $S_1 = AC$: $S_1 = 5k \cdot 3 = 15k$

The second car traveled a distance $S_2 = AB$: $S_2 = 3k \cdot 3 = 9k$

The total distance is $S_{(total\ distance)} = BC$.

$$S_{total\ distance} = S_1 + S_2$$

$$144km = 15k + 9k$$

$$144km = 24k$$

$$k = \frac{144km}{24} = 6km$$

$$S_2 = AB = 9k = 9 \cdot 6 = 54\ km$$

Answer:$54\ km$

15. The factory produced $568\ parts$ on the first day, $87\ fewer$ parts on the second day, and 65 more parts on the third day. How many parts were produced in total in the factory during these three days?

Solution:

$$1\text{st day-}A \rightarrow 568 \text{ pieces}$$

$$2\text{nd day-}B \rightarrow (568 - 87) \text{ pieces}$$

$$3\text{rd day-}C \rightarrow (568 - 87 + 65) \text{ pieces}$$

How many pieces did you make in total?

We will denote the total as S. We will find the answer by putting the values into this equation $S = A + B + C$.

$$S = 568 + (568 - 87) + (568 - 87 + 65) = 1595$$

Answer:1595 ***by***

16. A student bought 6 notebooks and had 100 *soums* left. If he had bought 8 notebooks, he would have been in debt for 300 *soums*. Accordingly, how much does one notebook cost?

Solution:

Method 1.

We take the total money→ X ,

The price of the notebooks→ t

$$\begin{cases} X = 6t + 100 \\ X = 8t - 300 \end{cases}$$

$$8t - 300 = 6t + 100$$

$$2t = 400$$

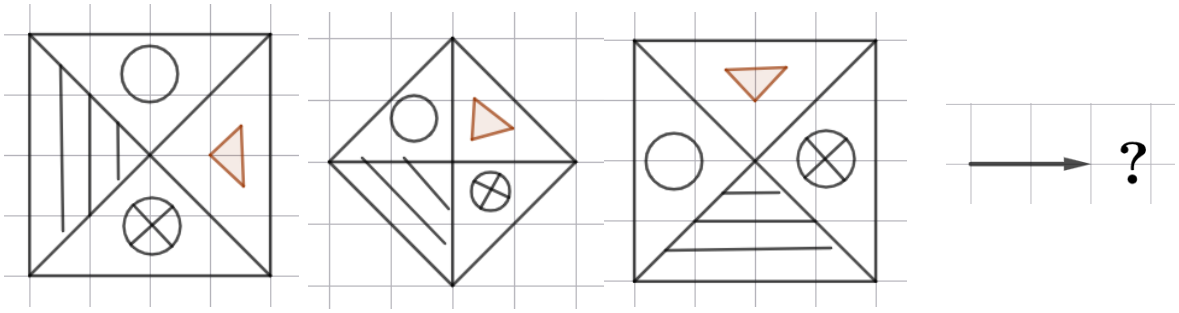
$$t = 200$$

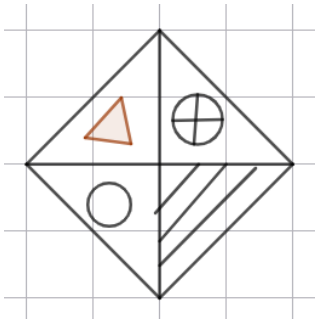
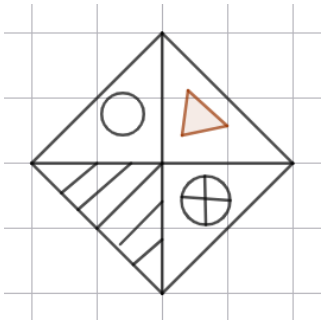
2-proposal.

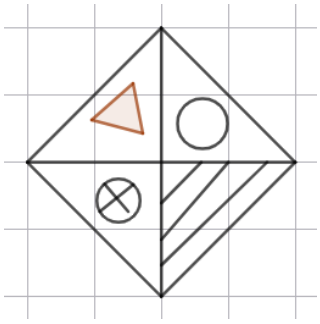
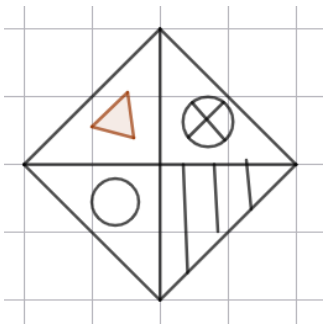
Easier logical method (Explanation): If a student wants to buy 8 notebooks instead of 6, he buys 2 extra notebooks. He had 100 *soums* before, but now he is short of 300 *soums*. So, for those 2 extra notebooks, he needs a total of 400 *soums* (100 + 300). If 2 notebooks cost 400 *soums*, then one notebook costs 200 *soums*.

Answer: 200 soums

17. Understand the logic and determine the appearance of an unknown shape.



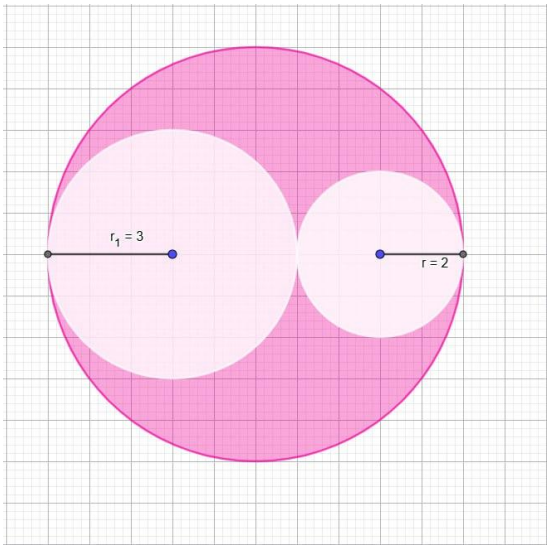
A)  B) 

C)  D) 

To find the unknown form, you must first find the identity. This question has the following identity. The position in the first form is rotated counterclockwise in the subsequent forms. Through this, we can find the form in the question. Now, if we look at the forms in the answer options, according to the law we mentioned, this answer is *A*

Answer: A

18. Circles of radii 2 and 3 are external to and both are internal to a larger circle (see figure). Find the area of the shaded figure.



Solution:

1-proposal.

Small radius→ $r_1 = 2, r_2 = 3$,large radius→ R =?, $S_{\text{painted surface}}$ =?

We can find the diameter of the large circle by the radii of the small circles.

$$d_1 = 2 \cdot r_1 \rightarrow d_1 = 2 \cdot 2 = 4$$

$$d_2 = 2 \cdot r_2 \rightarrow d_2 = 2 \cdot 3 = 6$$

$$d = d_1 + d_2 \rightarrow d = 4 + 6 = 10$$

$$R = \frac{d}{2} = \frac{10}{2} = 5$$

$$S_{\text{painted surface}} = \pi R^2 - p(r_2^2 + r_1^2)$$

$$S_{\text{painted surface}} = \pi 5^2 - p(3^2 + 2^2)$$

$$S_{\text{painted surface}} = 25\pi - 13\pi$$

$$S_{\text{painted surface}} = 12\pi$$

Answer:12π

2-proposal.

To make this problem clearer for younger students, we will explain it using the example of "Big Pie and Sweets":

1. Imagine. You have one big round pie. Two round cookies are placed inside it (white circles in the picture). Our task is to find the surface area of the pie (the painted part) that remains except for the cookies.

2. Find the size of the big pie. We know the size of the cookies, if the first cookie is 2 cm from the center to the edge, then its width from one edge to the other (width) will be 4 cm, the second cookie: If it is 3 cm from the center to the edge, then its width will be 6 cm. Since the two cookies are next to each other, the total width of the big pie is: $4 + 6 = 10\ cm.$

So, the distance (radius) from the center to the edge of the big pie is $5\ cm.$ $(10:5 = 2)$

3. Calculate the "areas". To find the area of a circle, multiply the radius by itself and add the magic symbol " π " (pi) next to it:

Large pie: $5 \cdot 5 = 25\pi$

Small cookie: $2 \cdot 2 = 4\pi$

Larger cookie: $3 \cdot 3 = 9\pi$

4. Find the shaded area. Now, we "remove" (separate) two cookies from the large pie: The cookies together take up: $4\pi + 9\pi = 13\pi$ space.

Remaining space: : $25\pi - 13\pi = 12\pi$

Answer: 12π

19. Sanjar burns 10 $calories$ for every 100 $meters$ he walks and 20 $calories$ for every 90 $meters$ he runs. He covered 3 km partly by walking and partly by running, and he burned a total of 520 $calories$. Accordingly, how many meters did Sanjar run?

Solution:

Sanjar burns 10 $calories$ for every 100 $meters$ he walks, which means $\frac{10}{100} = 0.1$ calories per meter.

He burns 20 $calories$ for every 90 $meters$ he runs, which means

$$\frac{20}{90} = \frac{2}{9}$$

calories per meter.

The total distance is 3 km, i.e.

$$3 \cdot 1000 = 3000metr.$$

The total energy expended is 520 kJ.

Let us denote the walking distance covered by Sanjar as x $(meters)$ and the running distance as y (meters).

The equation for the total distance is:

$$x + y = 3000 \ (1)$$

The equation for the total energy expended is as follows:

$$0.1x + 29y = 520 \ (2)$$

From the first equation, we find $x = 3000 - y$ and substitute it into the second equation:

$$0.1(3000 - y) + \frac{2}{9}y = 520$$

$$300 - 0.1y + \frac{2}{9}y = 520$$

$$\frac{2}{9}and - \frac{1}{10}y = 220$$

$$\left(\frac{20}{90} - \frac{9}{90}\right)y = 220$$

$$\frac{11}{90}y = 220$$

$$y = 200 \cdot \frac{9}{90}$$

$$y = 1800$$

Answer: Sanjar $1800metr$ **covered the distance while running.**

20. Find the sum of the numbers in parentheses 19 for this sequence.

$$(4; 6), (8; 10; 12), (14,16,18,20), \ldots$$

Solution:

First, we determine how many elements are in each group. Group 1 has 2, Group 2 has 3, Group 3 has 4, and so on. So each group has one more element than its ordinal number. This tells us how many elements are in bracket 19:$19 + 1 = 20$so$20\ years$ element bor.

To find the sum of the numbers in group 19, we need the first and last numbers in this bracket. To find the beginning of group 19, we first need to know how many numbers there are in the 18 groups.

$$2 + 3 + 4 + \ldots + 19 = 189\ by\ choice.$$

This means that the first number in the group of 19 is the 190th member of the general sequence of even numbers. Now we find the 190th even number:$2 \cdot 190 + 2 = 382$ this is the first is sue

Last is sue:$382 + (20 - 1) \cdot 2 = 382 + 38 = 420$

$$S_{Group\ 19} = \frac{382 + 420}{2} \cdot 20 = 401 \cdot 20 = 8020$$

Answer:8020

21. Buses from Ahangaran to Chirchik depart every 30 $minutes$. When I was driving from Chirchik to Ahangaran, I saw a bus coming into Chirchik. 10 $minutes$ later, another bus passed in front of me. If the bus takes 1 hour to travel between the cities, how much longer will it take me to get to my destination? (minutes)

Solution:

Method 1.

Buses depart every $30\ minutes$, covering the distance in $60\ minutes$ → so the distance between consecutive buses is half the distance. Two buses coming from opposite directions were seen in $10\ minutes$ → this means that your speed is $2\ times$ the speed of the bus. Therefore, you will cover the entire distance in $30\ minutes$. But by the time you see the first bus, $\frac{1}{3}$ of the way has already been left behind, that is, you will have walked 10 minutes.

So: $30 - 10 = 20$, if you walk for $20\ minutes$, you will reach your destination.

2-proposal.

(Algebraic method), that is, we solve using the unknown letter and the equation:

1. Identify the unknowns:

The distance between cities —S we can say.

The speed of the bus — $\boldsymbol{v_a}$ we can say.

The speed of the car —$\boldsymbol{v_m}$ we can say.

2. Let's express the data mathematically:

The bus travels the distance in $60\ minutes$: $\boldsymbol{v_a} = \frac{S}{60}$

The distance between the two buses is the bus's $30 - minute$ journey:

$L = \boldsymbol{v_a} \cdot 30 = \frac{S}{60} \cdot 30 = 0.5S$ (i.e. half the distance)

3. Let's make an equation: Since the car and the bus are moving towards each other, their relative speed is $(\boldsymbol{v_m} + \boldsymbol{v_a})$. They covered this $0.5S$ distance in $10\ minutes$:

4. Solve the equation: From the previous expression, we know that $\boldsymbol{v_a} = \frac{S}{60}$, so we substitute this:

$$\left(\boldsymbol{v_m} + \frac{S}{60}\right) \cdot 10 = 0.5S$$

Open the brackets: $10\boldsymbol{v_m} + \frac{10S}{60} = 0.5S$

$$10\boldsymbol{v_m} + \frac{S}{6} = 0.5S$$

$10\boldsymbol{v_m} = 0.5S - \frac{S}{6}$ (reduce to a common denominator)

$$10v_m = \frac{3S - S}{6} = \frac{2S}{6} = \frac{1S}{3}$$

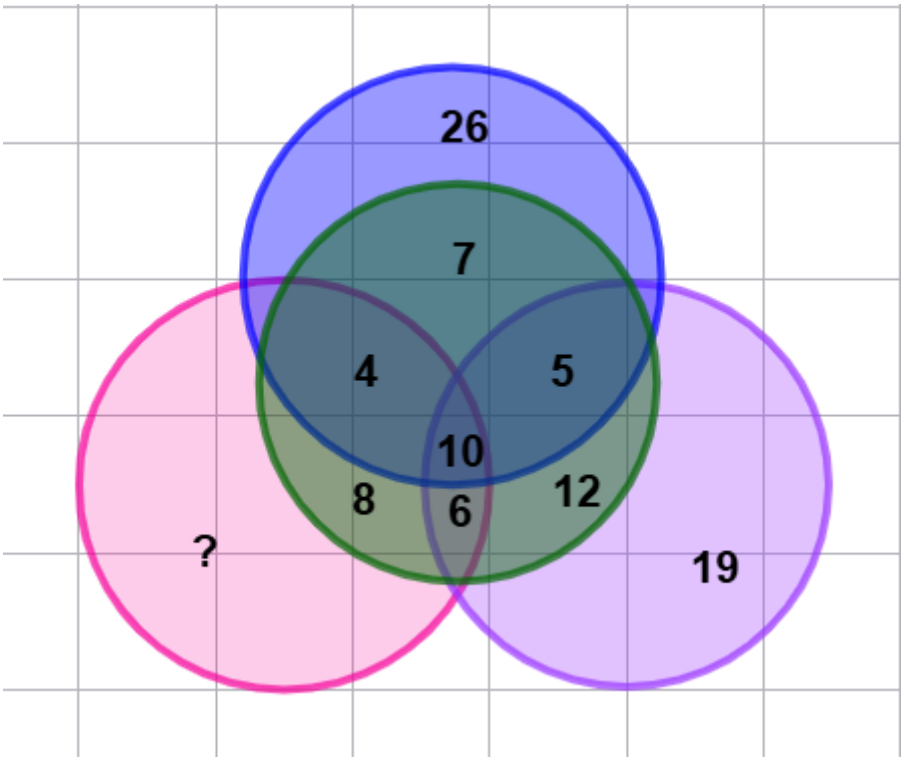
$$v_m = \frac{S}{30}$$

5. Conclusion: Machine speed $v_m = \frac{S}{30}$. This car drove all the way.In 30 $minutes$ means that the machine is already10 $minutes$ walked.

Time left to destination:$30 - 10 = 20$ $minutes$.

Answer:20 $minutes$

22. Find the number that was omitted.



Solution:

We have 4 sets, each of which is equal to the other. Using this conclusion, we solve the following problem. The omitted number$With$ We can define it with .

Elements of set 1:$X_1 = \{26,7,5,4,10\}$

Elements of set 2:$X_2 = \{19,12,10,5,6\}$

Set 3 elements:$X_3 = \{4,10,6,8,z\}$

Set 4 elements:$X_4 = \{4,7,5,10,12,8,6\}$

$$X_1 = 26 + 7 + 5 + 4 + 10 = 52$$

$$X_2 = 19 + 12 + 10 + 5 + 6 = 52$$

$$X_3 = 4 + 10 + 6 + 8 + z = 28 + z$$

$$X_4 = 4 + 7 + 5 + 10 + 12 + 8 + 6 = 52$$

Using these$With$element can be found, we$X_3 = X_4$we use equality.

$$28 + z = 52$$

$$z = 52 - 28$$

$$z = 24$$

Answer: 24

23. A father's age is the sum of the ages of his 3 $children$. The children were born 2 $years$ apart. If the father's current age is 48, how old was the father when his eldest child was born?

$$Order \rightarrow x$$

$$1st\ child \rightarrow y$$

$$2st\ child \rightarrow y - 2$$

$$3st\ child \rightarrow y - 4$$

$$x - y = ?$$

Solution:$y + y - 2 + y - 4 = 48$

$$3y - 6 = 48$$

$$3y = 54$$

$y = 18$,$x - y = 48 - 18 = 30$

Answer:$30yosh$

24. Find the number in the question mark based on the rule below.

$$96\ (16)12; 78\ (12)13; 88\ (?)11$$

We need to find the necessary legislation for this issue.

$96: 12 = 8 \rightarrow 8 \cdot 2 = 16$ The first law is that $96\ (16)12$The number in parentheses is obtained by dividing the number on the left side of this expression by the number on the right side and multiplying the resulting number by two. We can calculate the remaining elements in the same way and find the number in the ? −position.

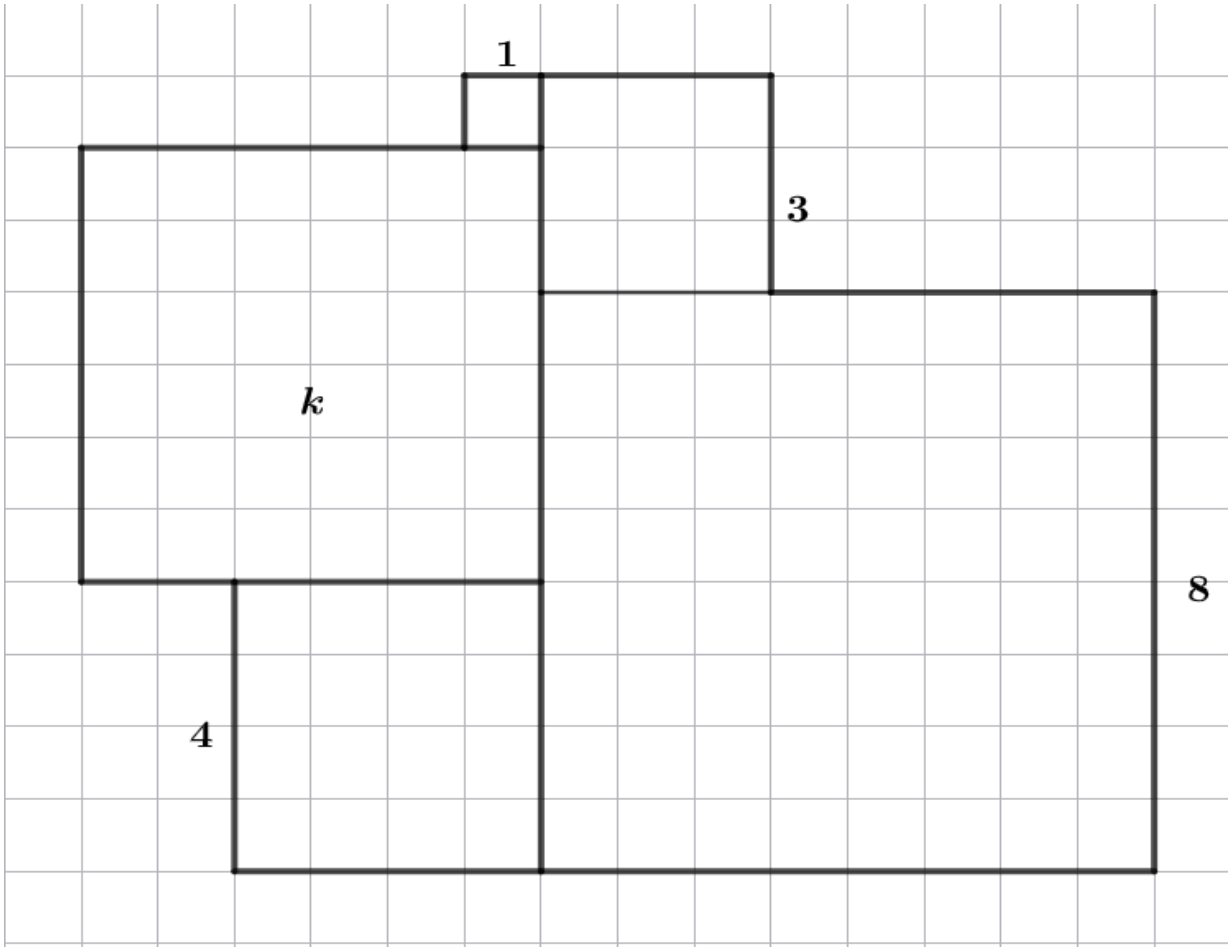
$$78:13 = 6 \rightarrow 6 \cdot 2 = 12$$

$88:11 = 8 \rightarrow 8 \cdot 2 = 16$

$\rightarrow sthe'morethe'It\ is\ clear\ that\ the\ number\ in\ thethe'It\ happened.$

Answer: 16

25. The figure below shows 5 squares. Find the area of the figure.



Solution:

To find the area of this shape, you first need to find its side. The vertical length is $3 + 8. k = 3 + 8 - 1 - 4$, which gives the length of the side of the shape in question. $k = 6$

$$S_k = k^2 = 6^2 = 36$$

Answer:36

26. $101112 \ldots 3940$ Determine the sum of the digits of the number.

Solution:

$101112 \ldots 3940 =$? We calculate the sum of the digits of each decimal.

$$\begin{matrix}10\\11\\12\\13\\14\\15\\16\\17\\18\\19\end{matrix}\quad\overline{1\cdot 10+\frac{1+9}{2}\cdot 9=10+45}\quad,\quad\begin{matrix}20\\21\\22\\23\\24\\25\\26\\27\\28\\29\end{matrix}\quad\overline{2\cdot 10+\frac{1+9}{2}\cdot 9=20+45}\quad,$$

$$\begin{matrix}30\\31\\32\\33\\34\\35\\36\\37\\38\\39\end{matrix}\quad\overline{3\cdot 10+\frac{1+9}{2}\cdot 9=30+45}\quad,10+45+45+30+45+4+0=199$$

Answer: 199

27. The age of a father is equal to the sum of the current ages of his four children born 4 $years$ apart. If the father was 42 $years$ old when the oldest child was born, how old is the youngest child now?

Solution:

$$\begin{matrix}\text{father}\ \to x\\ 1-\text{child}\to y\\ 2-\text{child}\to y-4\\ 3-\text{child}\to y-8\\ 4-\text{child}\to y-12\end{matrix}\quad,x-y=42,\ y-12?$$

$$\begin{cases}y+y-4+y-8+y-12=x\\ x-y=42\end{cases}$$

$\begin{cases}4y-x=24\\ x-y=42\end{cases}$,$x=42+y$ Substituting into the equation above,and we find.

$$4y-42-y=24$$

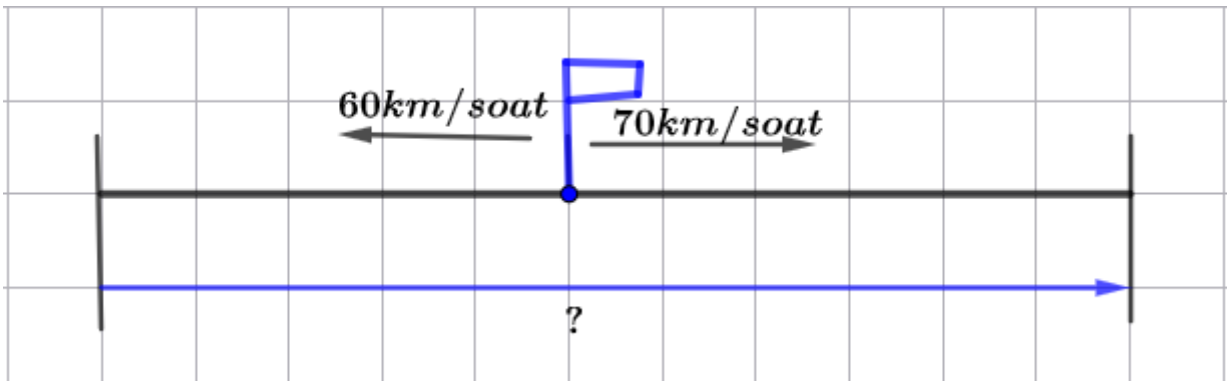
$$3y=66$$

$$y = 22$$

$$y - 12 = 22 - 12 = 10$$

Answer: 10

28. Two cars left the gas station at the same time in opposite directions. The speed of one of them was $60\frac{km}{hour}$,the speed of the latter $70\frac{km}{hour}$,



What is the distance between these cars after 3 hours?kmwill it be?

Solution:

1-proposal

We can find the sum of the velocities because they are moving from one point to the opposite direction.$\Delta v = v_1 + v_1$,$S = .\Delta v \cdot t$Let's put it into these formulas.

$$\Delta v = \frac{70km}{hour} + \frac{60km}{hour} = \frac{130km}{hour}$$

$$S = \frac{130km}{hour} \cdot 3soat = 390km$$

Answer:$390km$

2-proposal.Using the first and second velocities, we can calculate the distance of each. This will give us the total distance.

$S_1 = v_1 \cdot t$, $S_2 = v_2 \cdot t$, $S_{general} = S_1 + S_2$

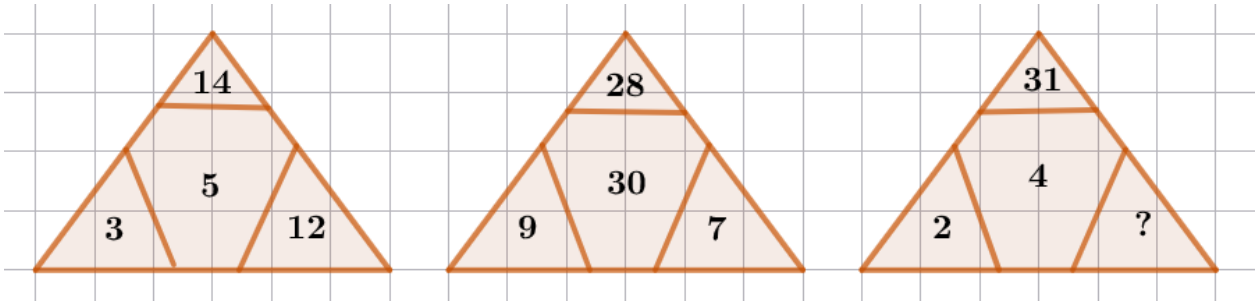
$$S_1 = \frac{60km}{hour} \cdot 3soat = 180km$$

$$S_2 = \frac{70km}{hour} \cdot 3soat = 210km$$

$$S_{general} = 180km + 210km = 390km$$

Answer:$390\ km$

29. Which number should replace the question mark?



Solution:

It turns out that we have the following rule. That is, the difference of two numbers is equal to 2. This way, we can find the solution.

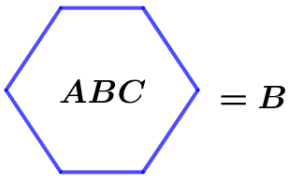
Form 1:$\{14-12=2\ 5-3=2$

Form 2:$\{30-28=2\ 9-7=2$

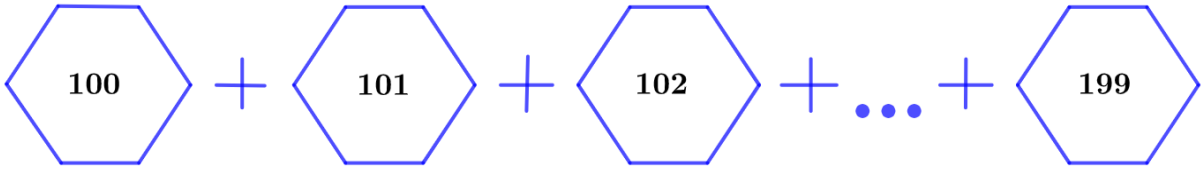
Figure 3:$\{31-x=2\ 4-2=2\ ,31-x=2,\ \ x=31-2,\ x=29$

Answer: $x=29$

30. The following correspondence is given for the 3-digit number ABC:



Then find the value of the sum below.



in this form$ABC$is an element, and it is equal to the number in the matrix. That is,$ABC=B$.

Solution:

Let's solve the example using this equation.

$$100+101+102+\cdots+109=0$$

$$110+111+\cdots+119=1\cdot 10=10$$

$$120+121+\cdots+129=2\cdot 10=20$$

$$130+131+\cdots+139=3\cdot 10=30$$

$$140 + 141 + \cdots + 149 = 4 \cdot 10 = 40$$

$$150 + 151 + \cdots + 159 = 5 \cdot 10 = 50$$

$$160 + 161 + \cdots + 169 = 6 \cdot 10 = 60$$

$$170 + 171 + \cdots + 179 = 7 \cdot 10 = 70$$

$$180 + 181 + \cdots + 189 = 8 \cdot 10 = 80$$

$$190 + 191 + \cdots + 199 = 9 \cdot 10 = 90$$

$$Total = 0 + 10 + 20 + 30 + 40 + 50 + 60 + 70 + 80 + 90 = 450$$

Answer: 450

11-variant

1. Calculate:$[(48:16 + 23 - 5) \cdot 5 - 15] \cdot [(51:3 + 5) \cdot 3:11] =?$

A) 330

B) 240

C) 180

D) 540

2. The sum of 4 consecutive natural numbers is 106. Find the largest of these numbers.

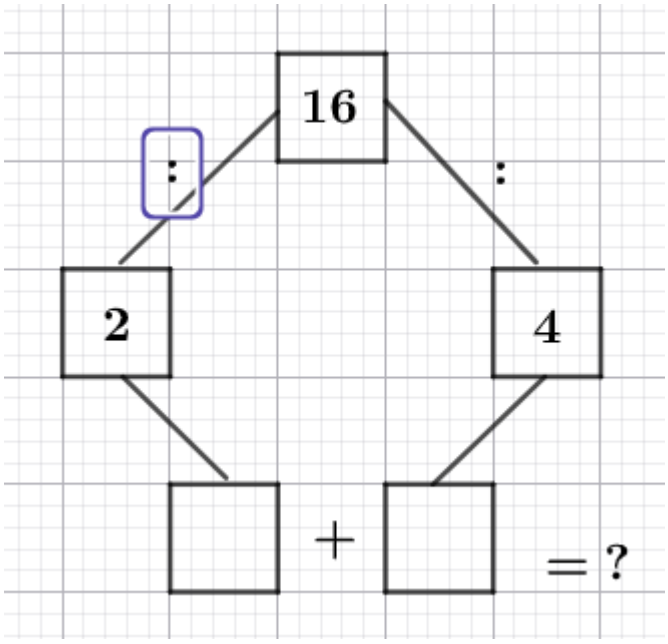
A) 21

B) 28

C) 32

D) 27

3. Find the number in the question mark:



A) 4

B) 8

C) 12

D) 14

4. Find the difference between the largest and smallest natural numbers that can be substituted for the flower.

$$1200 > \text{✿} > 1189$$

A) 9

B) 10

C) 90

D) 19

5.It is known that the area of a rectangular area is $3\,m^2$.Find the area of this measurement in cm^2.

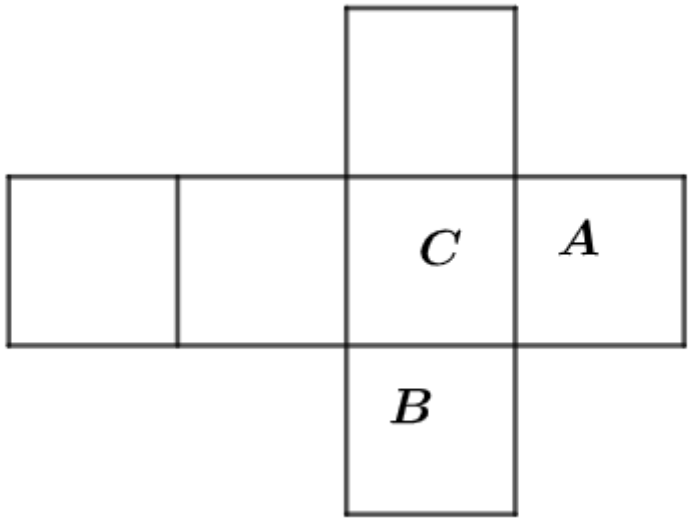
A) 20

B) 21

C) 23

D) 2

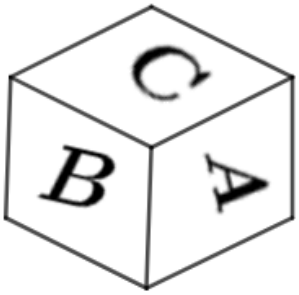
6. The distribution of the cube is as follows:

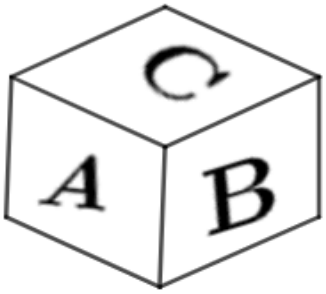


Which of the following could be the shape of a cube?

A) 

B) 

C) 

D) 

7. When the farmer harvested the corn stalks,20%It consists of water. It is made by drying the corn stalks a little.12%Once it is made into water, it is tied up and sold in the market. If it is really1 tonIf he plans to sell the corn stalks, how much of the crop will he have to harvest?

A) 1080kg

B) 1100kg

C) 1400kg

D) 1667kg

8. A worker assigned to perform a specific task 3 $hours$ and the second worker6 $hours$takes time. After the first worker worked for an hour, a second worker joined him. How long will it take for the two workers to finish the remaining work together?

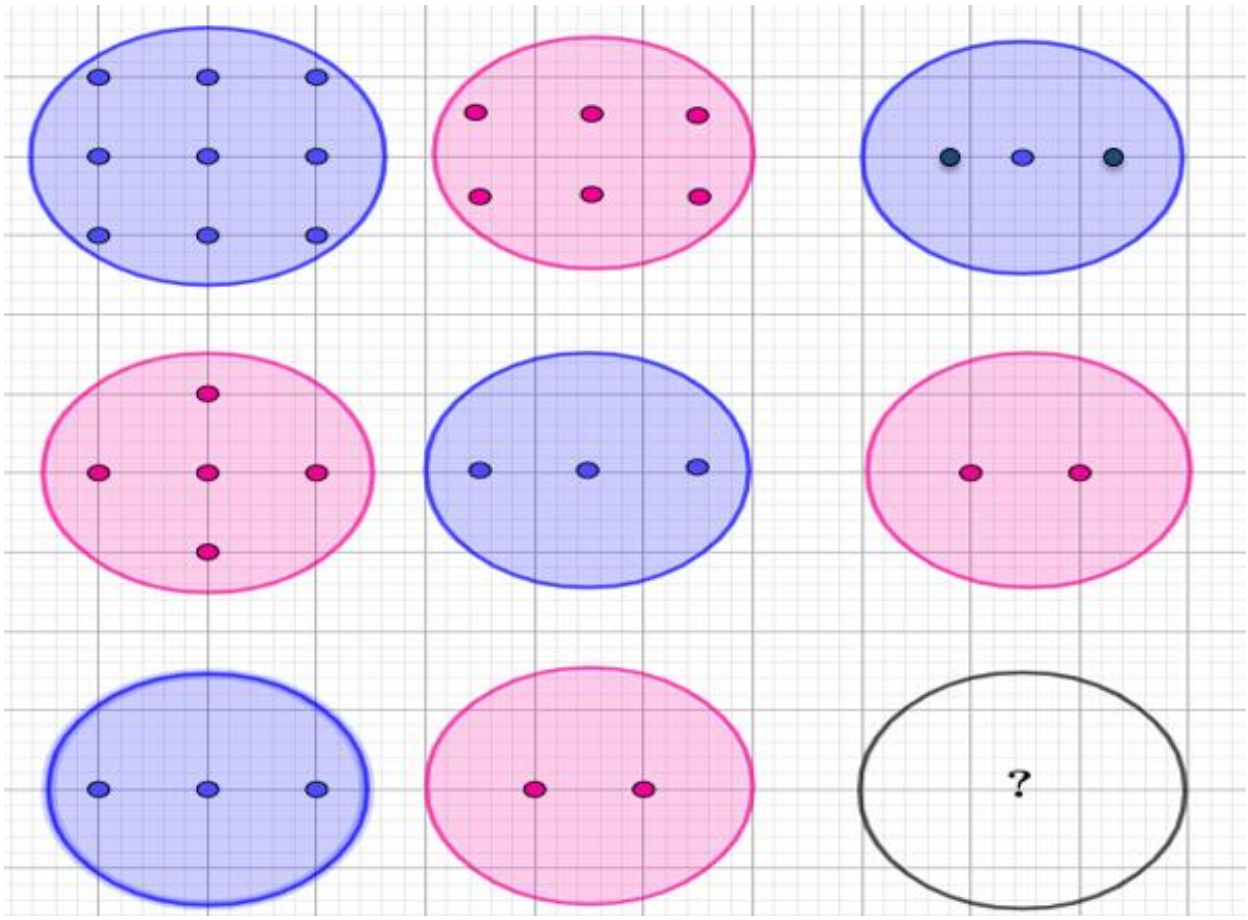
A)2 $hours$ 30 $minutes$

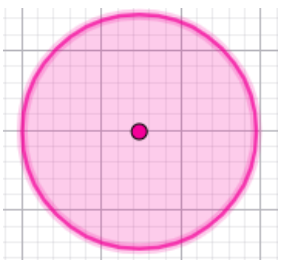
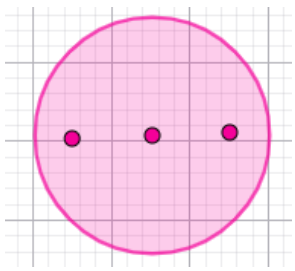
B) 1 $hour$ 40 $minutes$

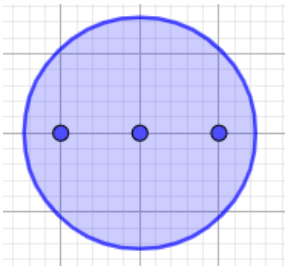
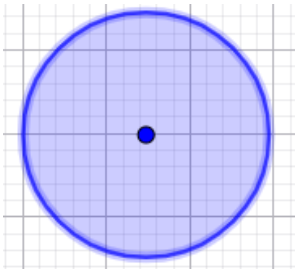
C) 1 $hour$ 20 $minutes$

D) 2 $hours$

9. Understand the logic and determine what is hidden in the question.



A)  B) 

C)  D) 

10. 6 $of\ them$ from various fruits 2 $of\ them$ How many different ways can you choose ?

A) 30

B) 20

C) 15

D) 25

11. 80%with benefit360$ product for 30% How much with profit? $ sold to?

A) 250

B) 260

C) 300

D) 320

12. When a farmer harvests corn stalks, they are 20% water. He wants to dry the corn stalks a little so that they are 12% water, then tie them up and sell them at the market. If he plans to sell exactly 1 ton of corn stalks, how much will he have to harvest?

A) 3

B) 4

C) 5

D) 6

13. In a 400 m race, when the first athlete reached the finish line, the second athlete had 40 m to go, and the third athlete had 85 m to go. If the athletes ran at the same speed, how many m will the third athlete have left when the second athlete reaches the finish line?

A) 35

B) 55

C) 30

D) 45

14. March $20, 2022$ at $12{:}00$ will be 100 $days$ since Halim's birth.

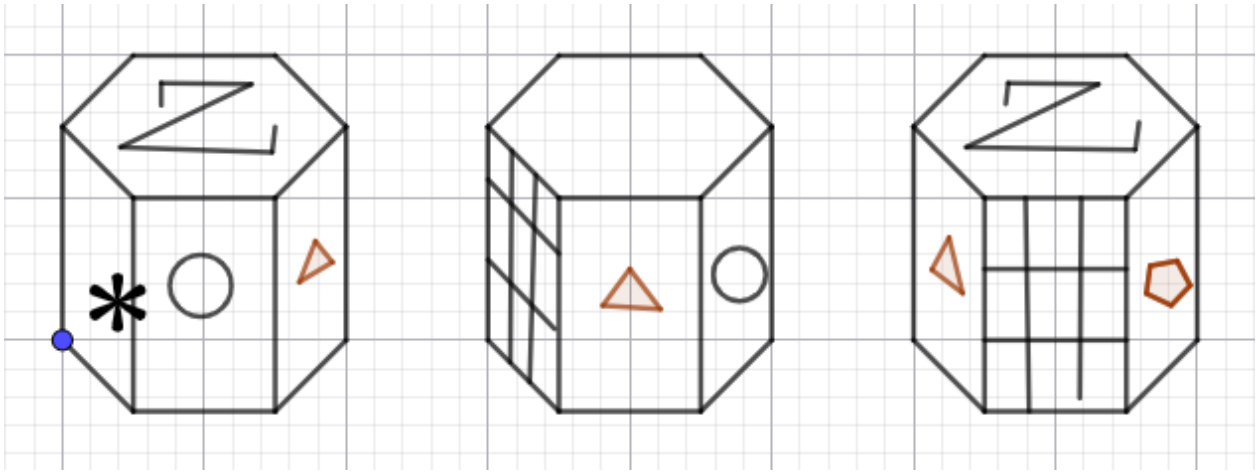
A) $20 - December$

B) $10 - December$

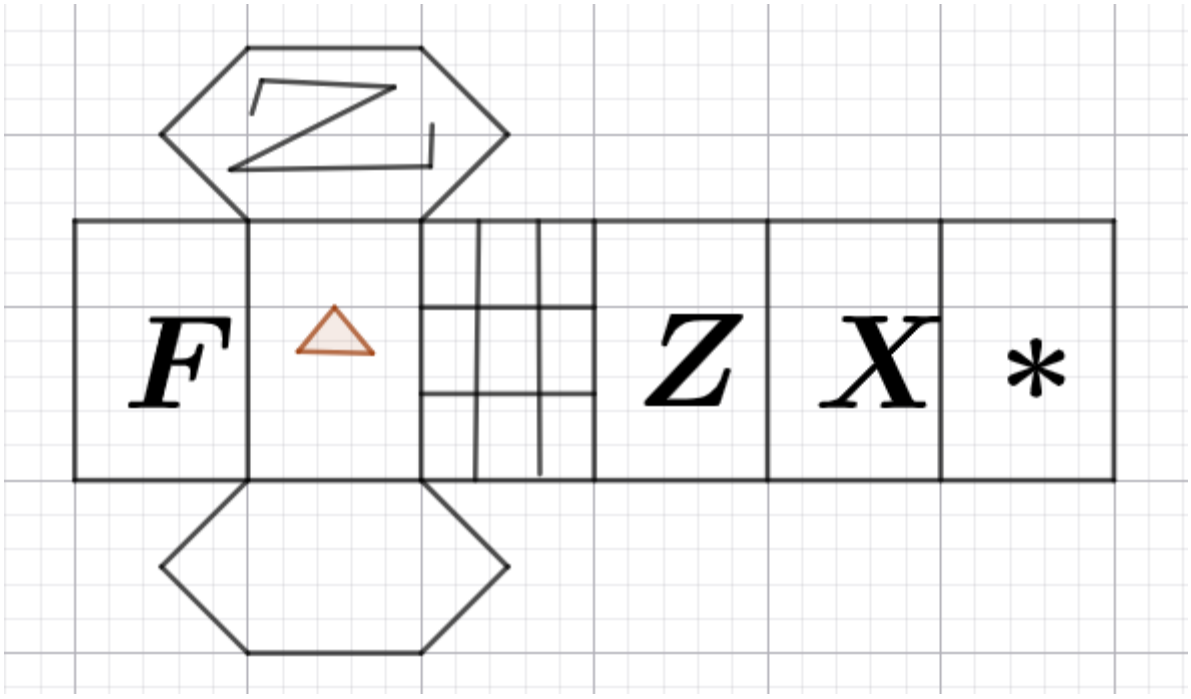
C) $22 - December$

D) $12 - December$

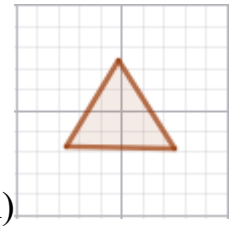
15. The following spatial shape is shown from different angles:

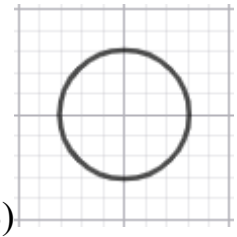


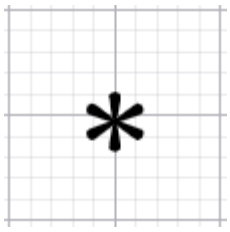
It was distributed as follows:



Determine what symbol is in place of X.

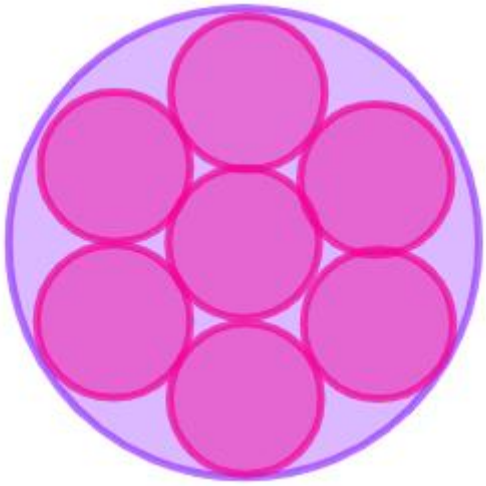
A) 

B) 

C) 

D) 

16. The small circles in the figure have radii of one. The innermost circle touches the six circles surrounding it, and each of these circles touches the large circle and two neighboring circles. Find the area of the shaded sphe



A)π

B)1.5 π

C)2 π

D)3 π

17. How many different 3-digit numbers can be formed using the digits 0,1,3,5,7?

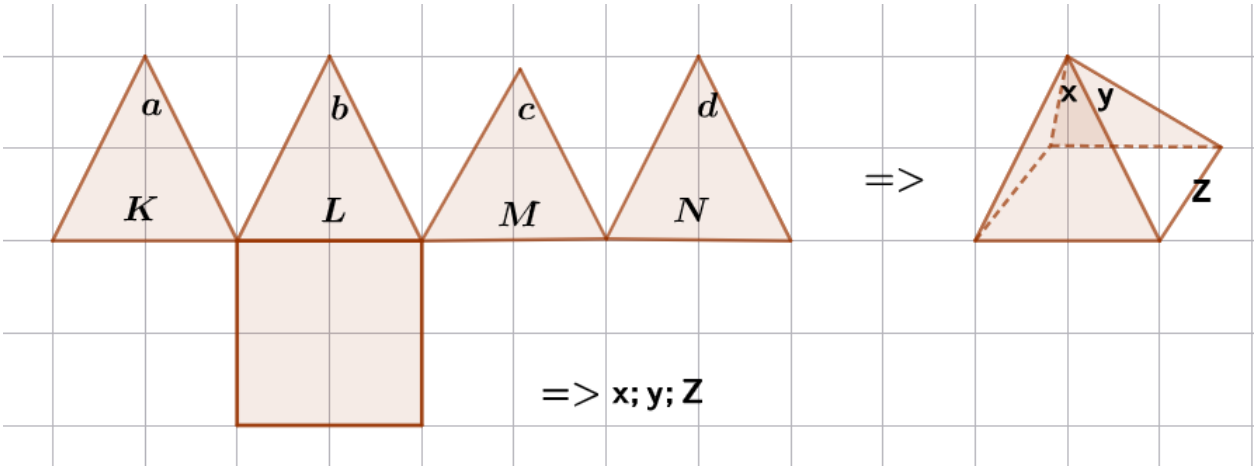
A) 48

B) 100

C) 72

D) 80

18. Based on the drawing, determine the answer option corresponding to the question mark.



A) a, c, L

B) b, a, K

C) a, d, N

D) d, c, M

19. Ahmed can finish a job in 12 $hours$, while Mirali can finish it in 8 hours. After Ahmed started the job and worked for 4 $hours$, Mirali came to help. After they worked together for 2 $hours$, Ahmed left. Accordingly, in how many hours can Mirali finish the remaining job alone?

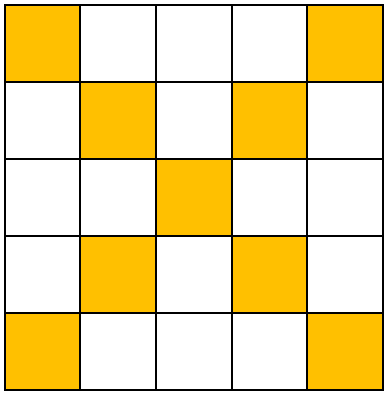
A) 1

B) 2

C) 3

D) 4

20. What percentage of the total number of small squares are the small squares colored in the given shape?



A) 25

B) 33

C) 36

D) 56

21. The following table is given:

#	1	2	3	4
1	3	4	1	2
2	4	1	2	3
3	1	2	3	4
4	2	3	4	1

For example,$1\#1 = 3\ or\ 2\#1 = 4$

So that $a^2 = a\#a, a^3 = a\#a\#a = (a\#a)\#a$ if,4^{100} =?

A) 1

B) 2

C) 3

D) 4

22. Given points $A\ (15), B\ (23)$, and $D\ (35)$ on a coordinate ray, determine what fraction of the length of the segment $\overline{BD}$ is the segment length $\overline{AD}$.

A) $\frac{12}{20}$

B) $\frac{8}{20}$

C) $\frac{8}{12}$

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

23. Murodjon drove his new car from Andijan to Tashkent at a speed of $180\ km/h$. The car was caught on radar and had to pay a fine. Then he returned to Andijan at a speed of $60\ km/h$. Find his average speed on the way there and back.

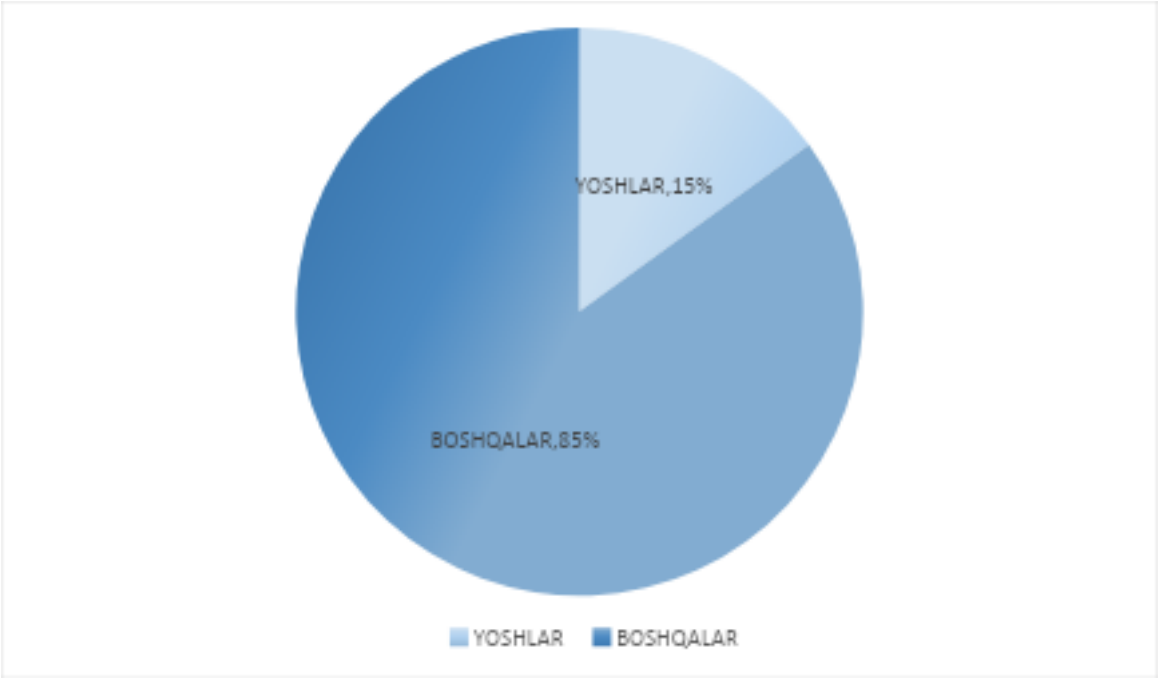
A)$90km/h$

B)$100km/h$

C)$108km/h$

D)$120km/h$

24. It is known that the ratio of young people to the rest of the population in Uzbekistan is $\frac{3}{17}$. Accordingly, in a pie chart showing the proportion of young people and other population in Uzbekistan, how many degrees is the part reserved for young people?



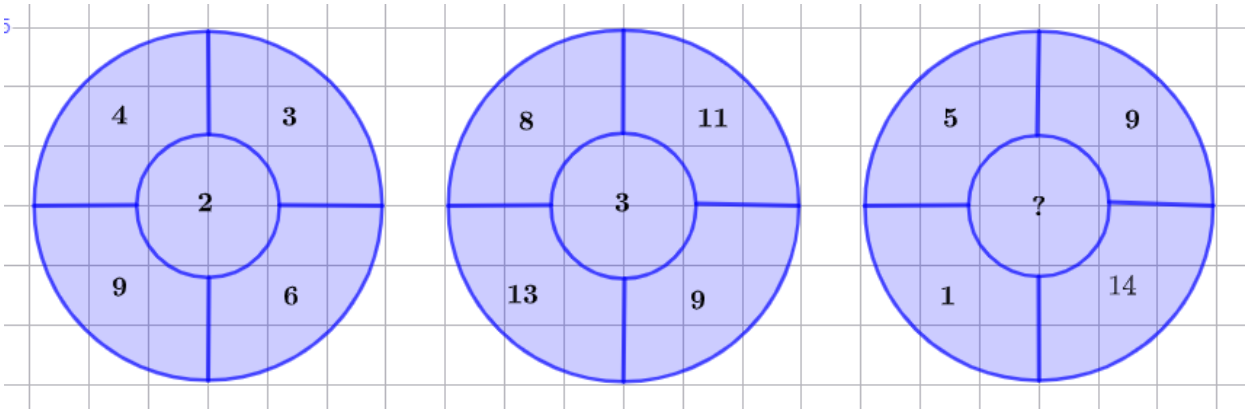
A) 48

B) 52

C) 54

D) 56

25. Understand the rule and find the number in the question mark.



A) 7

B) 79

C) 9

D) 17

26. Do the addition: $8m^2 66dm^2 37cm^2 + 21m^2 48dm^2 90cm^2 = ?$

A)$30.01527m^2$

B)$30.1527m^2$

C) $30.15027m^2$

D) $30.015027m^2$

27. The terms of using MY Taxi service in city A are as follows;

Initial amount: $5000\ soums$

For each km within $0-5\ km$: $800\ soums$

For each km within $5-10\ km$: $600\ soums$

For each km beyond $10\ km$: $500\ soums$

For each minute of waiting for a taxi: $400\ soums$

Accordingly, how much should a passenger pay for a taxi if he goes from city A to city B, which is $16\ km$ away, waits for the same taxi for $20\ minutes$, and then returns to city A?

A)$33000\ soums$

B)$29000\ soums$

C)$38000\ soums$

D)$43000\ soums$

28. Calculate: $1-\frac{2}{\frac{5}{\frac{4}{7}-\frac{1}{3}}} = ?$

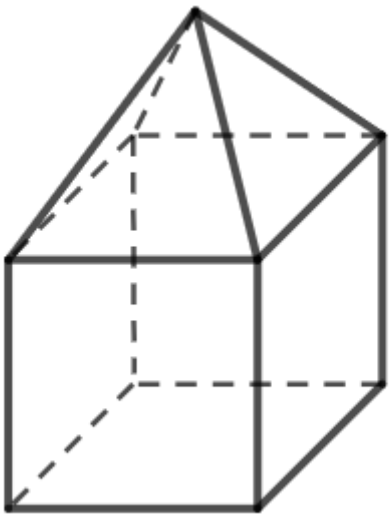
A) 0

B) $\frac{3}{21}$

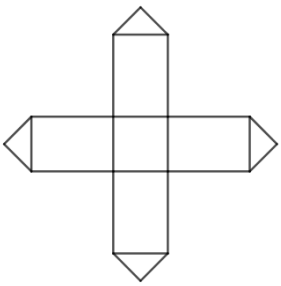
C) $\frac{5}{24}$

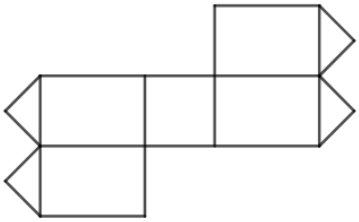
D) $\frac{19}{21}$

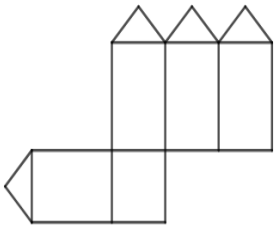
29. Given the following form:

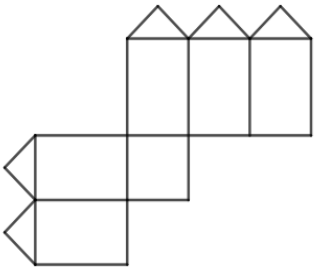


Which of the following is not a distribution of this shape?

A) 

B) 

C) 

D) 

30. 392 athletes need to undergo medical examination at the sports complex. On the first day, $\frac{4}{7}$ of the athletes were examined, and on the second day, $\frac{2}{3}$ of the remaining athletes were examined. How many more athletes need to be examined?

A) 42

B) 56

C) 49

D) 70

Test methods and answer sets.

1. Calculate: $[(48:16+23-5)\cdot 5-15]\cdot[(51:3+5)\cdot 3:11]=?$

Solution:

We perform the operations one by one.

The first operation is to work out the left bracket in order:

$$[(48:16+23-5)\cdot 5-15]=(3+23-5)\cdot 5-15=21\cdot 5-15=90$$

The second operation is to work out the second bracket:

$$[(51:3+5)\cdot 3:11]=(17+5)\cdot 3:11=22\cdot 3:11=6$$

The third operation is found by multiplying the first and second operations together, and the resulting number is also the answer.

$$90\cdot 6=540$$

Answer: 540

2. The sum of 4 consecutive natural numbers is 106. Find the largest of these numbers.

Solution:

Sequential means that the same number is either increasing or decreasing. I will work out this example in two different ways.

Method 1:

We have determined the smallest number as x and calculated the remaining numbers in increasing order from x by the same amount. We are asked $x+3=?$

$$x+x+1+x+2+x+3=106$$

$$4x+6=106$$

$$4x=106-6$$

$$4x=100$$

$$x=25$$

$$x+3=25+3=28$$

Answer: 28

Method 2:

We have defined the largest number as x and counted the remaining numbers in descending order by the same amount from x. We are asked x =?

$$x + x - 1 + x - 2 + x - 3 = 106$$

$$4x - 6 = 106$$

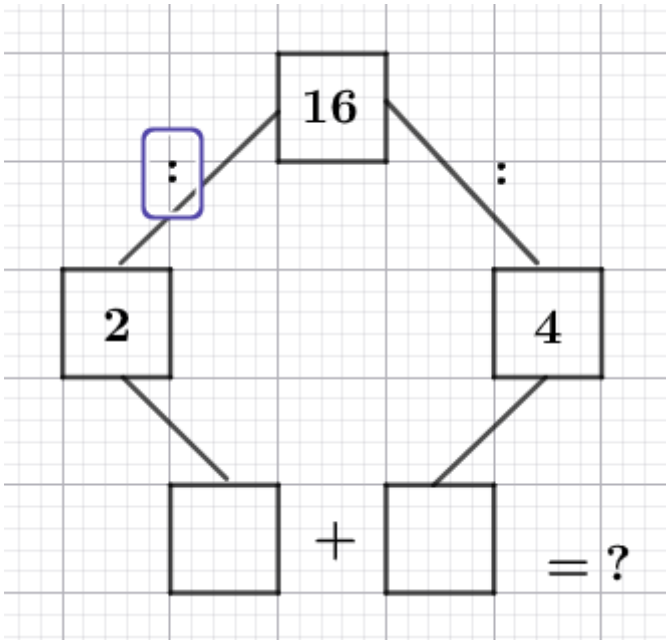
$$4x = 106 + 6$$

$$4x = 112$$

$$x = 28$$

Answer: 28

3. Find the number in the question mark:



Let's explain the problem step by step and in a clear way. In the given expression, one number $-$ 16 is divided in two different ways and the results are added. That is:

$: \begin{cases} 16:2 = x \\ 6:4 = y \end{cases}$ Then $x + y$ is found.

Step 1: Find $16:2 = x$. Here, the number 16 is being divided by 2. If we divide 16 by 2: $16 \div 2 = 8$, then: x=8

Step 2: Find y $16:4 = y$ This time, the number 16 is being divided by 4.

If we divide 16 by 4: $16 \div 4 = 4$, then: y=4

Step 3: Calculate $x + y$. Now we add the values we found:

$x + y = 8 + 4 = 12$

Final Conclusion In this problem, the same number (16) was divided by different divisors and the results were added. Therefore, the final answer is: 12

Answer:12

4. Find the difference between the largest and smallest natural numbers that can be substituted for the flower.

$$1200 > ✿ > 1189$$

Solution: The number to be substituted for the flower must be greater than 1189 but less than 1200. That is, these numbers are natural numbers between $1189\ and\ 1200$.

Step 1: Determine the numbers in the range.

The smallest natural number after 1189: 1190

The largest natural number before 1200: 1199

So, the possible numbers are: 1190,1191,1192, … ,1199

Step 2: Find the smallest and largest.

Smallest number: 1190

Largest number: 1199

Step 3: Find the difference between them

The difference is the smaller number subtracted from the larger number: $1199 - 1190 = 9$

Summary: The difference between the largest and smallest numbers that can be substituted for the flower is: 9

Answer: 9

5. a, b and c are different numbers $\overline{abbc} - 4$ -digit number and $\overline{abbc} = (9c + 2)^2$ are valid, find $a + b + c$.

Solution:

To solve this example, we can find the solution by choosing a number.

$\overline{abbc} = (9c + 2)^2$ we need to choose a number such that the product is $\overline{abbc} - 4$-digit number. We choose a number for c.

$c = 1 \rightarrow (9c + 2)^2 = (9 \cdot 1 + 2)^2 = (11)^2 = 121$

$c = 2 \rightarrow (9c + 2)^2 = (9 \cdot 2 + 2)^2 = (20)^2 = 400$

$c = 3 \rightarrow (9c + 2)^2 = (9 \cdot 3 + 2)^2 = (29)^2 = 841$

$c = 4 \rightarrow (9c + 2)^2 = (9 \cdot 4 + 2)^2 = (37)^2 = 1369$

$c = 5 \rightarrow (9c + 2)^2 = (9 \cdot 5 + 2)^2 = (47)^2 = 2209$

$c = 6 \rightarrow (9c + 2)^2 = (9 \cdot 6 + 2)^2 = (56)^2 = 3136$

$c = 7 \rightarrow (9c + 2)^2 = (9 \cdot 7 + 2)^2 = (65)^2 = 4225$

$c = 8 \rightarrow (9c + 2)^2 = (9 \cdot 8 + 2)^2 = (74)^2 = 5476$

$c = 9 \rightarrow (9c + 2)^2 = (9 \cdot 9 + 2)^2 = (83)^2 = 6889$

It turns out that the number c satisfying the above condition is 9.

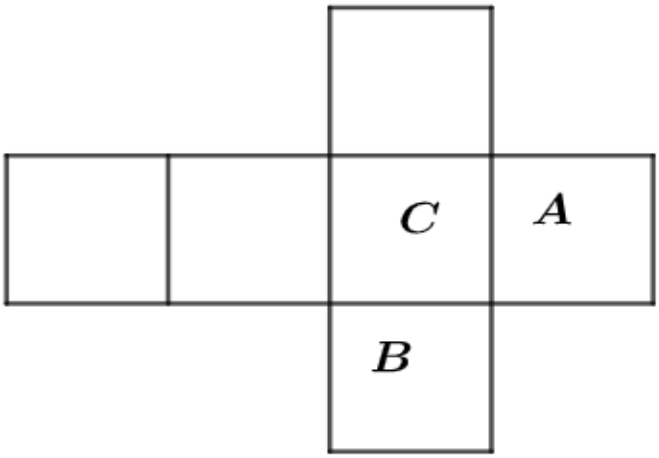
$c = 9 \rightarrow (9c + 2)^2 = (9 \cdot 9 + 2)^2 = (83)^2 = 6889$

Using this expression, we calculate the sum of the numbers a, b, c.

$a = 6, b = 8, c = 9 \rightarrow a + b + c = 6 + 8 + 9 = 23$

Answer: 23

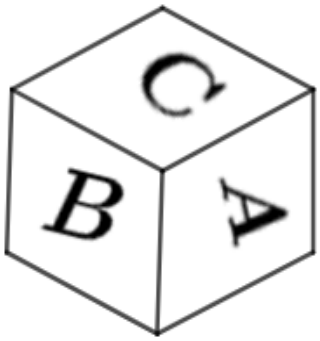
6. The distribution of the cube is as follows:

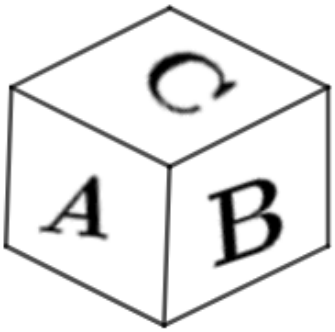


Which of the following could be the shape of a cube?

A)

B)

C) 

D) 

Solution:

In this example, the answer is found by thinking. Pay attention to the letter C in the spread, the letter A is located on the open side of the letter C, and the letter B is located at the bottom. Using this information, we determine the answer. In this case, only C is in the option.

Answer: C

7. When a farmer harvests corn stalks, they are 20% water. He wants to dry the corn stalks a little so that they are 12% water, then tie them up and sell them at the market. If he plans to sell exactly $1\ ton$ of corn stalks, how much will he have to harvest?

Solution:

$$\begin{matrix} X \to 20\% \\ 1tons \to 12\% \end{matrix} \Rightarrow X = \frac{1tons \cdot 20\%}{12\%} = \frac{5tons}{3} = 5 \cdot \frac{1000kg}{3} = 1667kg$$

Answer: 1667kg

8. One worker takes 3 hours to complete a certain task, and the second worker takes 6 hours. After the first worker has worked for one hour, a second worker joins him. How long will it take for the two workers to complete the remaining task together?

$\begin{matrix} 1 - worker \to 3\ hour \to x \\ 2 - worker \to 6\ hour \to y \end{matrix}$, We denote the total work →A.

$\frac{A}{x}$ → How long does it take for worker 1 to complete the entire job?

$\frac{A}{y}$ → How long does it take for worker 2 to complete the entire job?

$\frac{A}{x+y}$ → How long will it take for both workers to complete the entire job together?

Solution:

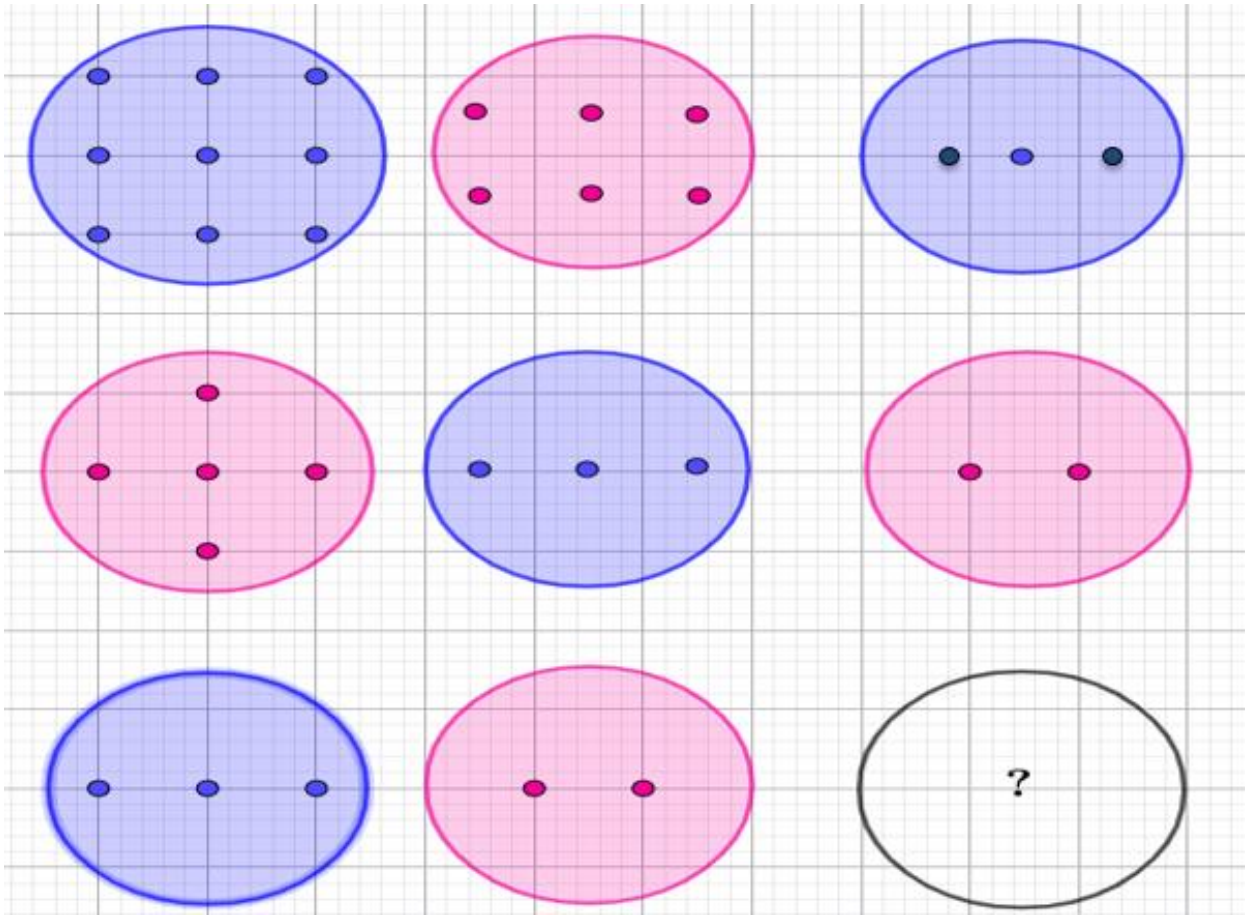
$$\frac{A}{x} = 3 \to x = \frac{A}{3}$$

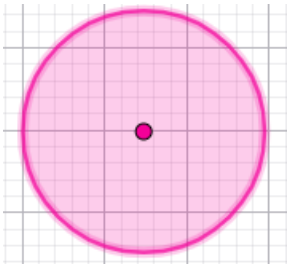
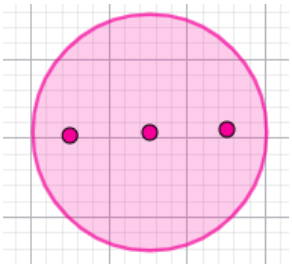
$$\frac{A}{y} = 6 \rightarrow y = \frac{A}{6}$$

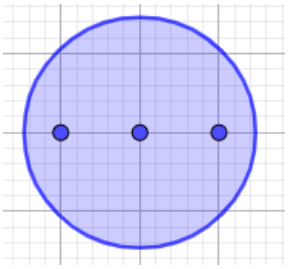
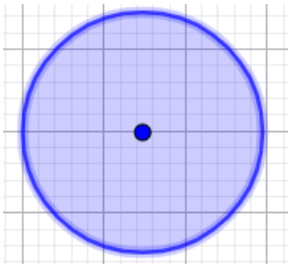
$$\frac{A}{x+y} = \frac{A}{\frac{A}{3}+\frac{A}{6}} = \frac{A}{\frac{2A+A}{6}} = \frac{A}{\frac{3A}{6}} = \frac{6A}{3A} = 2$$

Javob: 2 hour

9. Understand the logic and determine what is hidden in the question.



A)  B) 

C)  D) 

Solution:

This question contains the following truth: When we subtract the second element from the first element, the first element is formed, based on which we find the element in the question.

$$9 - 8 = 1$$

$$5 - 3 = 2$$

$$3 - 2 = 1 \rightarrow so\ there\ is\ 1\ shape\ inside\ the\ black\ element.$$

Answer: D

10. In how many different ways can we choose 2 $out\ of$ 6 different fruits?

Solution:

Method 1.

We will use the box method to choose 2 $out\ of$ 6 different fruits.

$N = a \cdot b$	a	b
N	6	5

$N = a \cdot b = 6 \cdot 5 = 30$ Since in this case there is also a case where the fruits are swapped, we divide this expression $N = a \cdot b = 6 \cdot 5 = 30$ into two.

$$N = \frac{(a \cdot b)}{2} = \frac{6 \cdot 5}{2} = \frac{30}{2} = 15$$

Note. In this method, $a \rightarrow total$ number of possibilities, $b \rightarrow remaining$ number of possibilities are expressions. We are asked to choose two out of 6 $fruits$, there are 6 $elements$ in total, so we use 5 $elements$ for the second element so that we do not have to choose again. In this case, there is also a case where the apples + pomegranates or pomegranates + apples, so we divide the expression into two.

Answer: 15

Method 2.

Working with the substitution formula. The formula for finding the number of substitutions of n elements without repeating them k times is:

$$C_n^k = \frac{n!}{k!\,(n-k)!}$$

$$C_6^2 = \frac{6!}{2!\,(6-2)!} = \frac{6!}{2!\cdot 4!} = \frac{1\cdot 2\cdot 3\cdot 4\cdot 5\cdot 6}{1\cdot 2\cdot 3\cdot 4\cdot 1\cdot 2} = 5\cdot 3 = 15$$

Answer: 15

11. A product with a profit of $80\%\ for\ \$360$ can be sold for how much with a profit of 30%?

Solution: $\begin{matrix}180\% \to 360\$ \\ 100\% \to X\$\end{matrix} \Rightarrow X = \frac{100\%\cdot 360\$}{180\%} = 200\$$

$200 is the original price of this product, now we calculate the product with a 30% profit. $\begin{matrix}130\% \to Z\$ \\ 100\% \to 200\$\end{matrix} \Rightarrow Z = \frac{130\%\cdot 200\$}{100\%} = 260\$$

Answer: $260\$$

12. The sum of the current ages of a family is 120. If the average age of the family members two years ago was 22, how many members are there in the family?

Solution:

Total age of the family→ $X = 120$

Number of family members→ n

Average age two years ago→ $y = 22n$

Using the notation, we form an equation:

$$120 = 22n + 2\cdot n$$

$$120 = 24n$$

$$n = \frac{120}{24}$$

$$n = 5$$

Answer: 5

13. In a 400 m race, when the first athlete reached the finish line, the second athlete had 40 m to go, and the third athlete had 85 m to go. If the athletes ran at the same

speed, how many m will the third athlete have left when the second athlete reaches the finish line?

Solution:

Formula for finding distance: $S = v \cdot t\,, v = const$

Total distance: $S = 400m$

When the first athlete reached the finish line, he had covered a distance of

$$S_1 = 400m$$

The second athlete did not reach the finish line by 40 meters, that is,

he ran $S_2 = 400 - 40 = 360m$

The third athlete covered $S_3 = 400 - 85 = 315m$

$$S_2 - S_3 = 360 - 315 = 45$$

Answer: 45

14. On March $20, 2022, at\ 12{:}00$, Halim's birthday will be $100\ days$ old. On which day was Halim born?

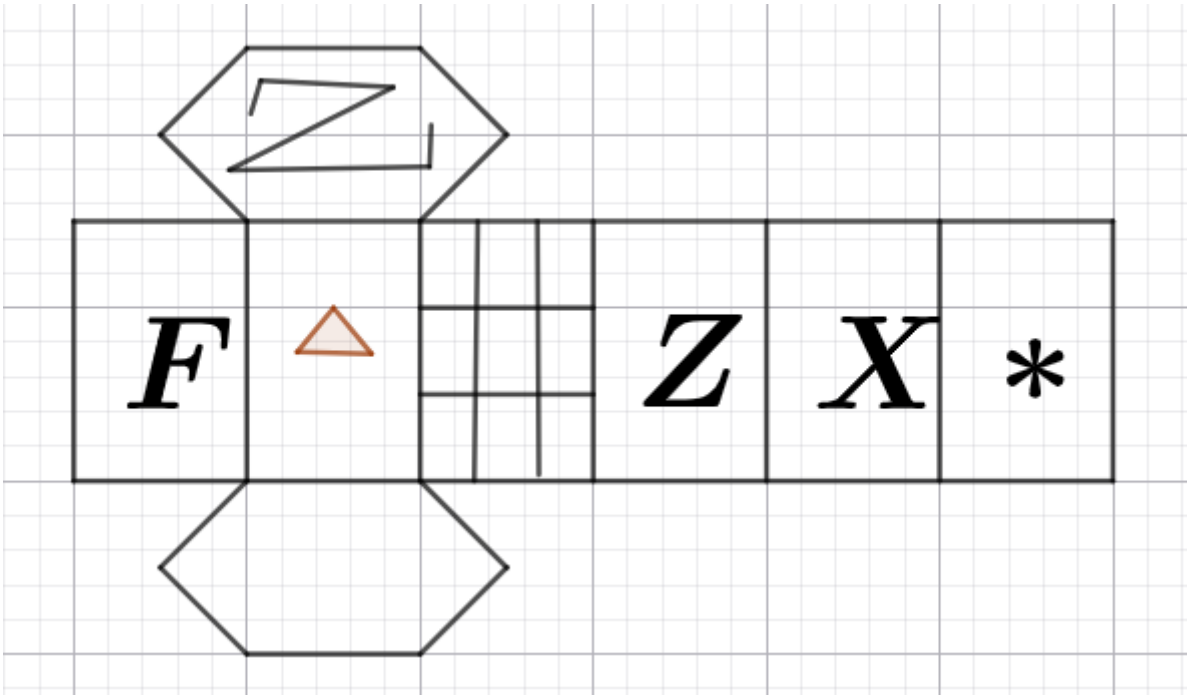
Solution:

$$\text{March} \rightarrow 20\ days\ \ 12^{00}$$
$$February \rightarrow 28\ days$$
$$January \rightarrow 31\ days$$
$$December \rightarrow 31\ days$$

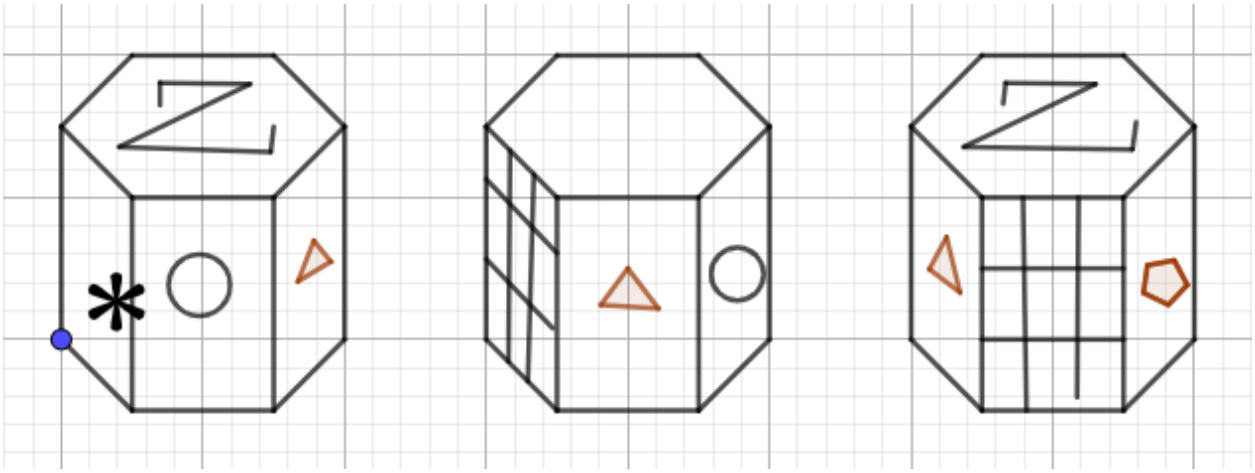
Let's calculate how many days are in $100\ days$. To do this, we go back one hundred days from $March\ 20$, $March + February + January = 20\ days + 28\ days + 31\ days = 79\ days$, since the sum of the days in these months is $79\ days$. To calculate the number of days since Halim's birthday: $100 - 79 = 21$, so we go back $21\ days$ from December. December has $31\ days$. $31 - 21 = 10$, so Halim was born on $December\ 10\ at\ 12{:}00$.

Answer: December 10

15. The following spatial shape is shown from different angles:



It was distributed as follows:



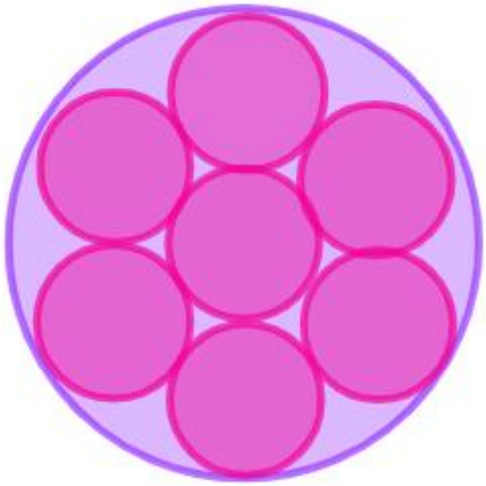
Determine what symbol is in place of X.

Solution:

We recreate the spread in our imagination, and then the objects in question will be formed by themselves. This way we will find out what shape is hidden in place of X. We know that the symbol in question is a circle.

Answer: a circle

16. The radii of the small circles in the figure are equal to one. The innermost circle touches the six circles surrounding it, and each of these circles touches the large circle and two adjacent circles. Find the area of the shaded sphere.



Solution:

We can find the diameter of a large circle by the radii of the small circles. The sum of the diameters of the 3 small circles is equal to the diameter of the large circle that surrounds them.

$d = 2 \cdot r \rightarrow$ this is the diameter formula

$D = 3 \cdot 2 \cdot r \rightarrow$ Diameter of a large circle

To find the shaded area, we need to subtract the areas of the small circles from the area of the large circle. This will give the desired area.

$$S_{small\ circle} = \pi r^2 \rightarrow \pi \cdot 1^2 = \pi,\ \ S_{a\ large\ circle} = \frac{\pi D^2}{4}\ \ ,\ S_{painted\ area} = ?$$

$$S_{painted\ area} = S_{kattaa\ large\ circle} - 7 \cdot S_{kichiksmall\ circle}$$

$$D = 3 \cdot 2 \cdot r = 6 \cdot 1 = 6, r = 1.$$

$$S_{painted\ area} = \frac{\pi \cdot 6^2}{4} - 7 \cdot \pi \cdot 1^2 = 9\pi - 7\pi = 2\pi$$

Answer: 2π

17. How many different 3-digit numbers can be formed using the digits 0,1,3,5,7?

Solution:

Method 1: How many different 3-digit numbers can be formed using 5 different digits? We will work it out using the box method.

$N = a \cdot b \cdot c$	a	b	c
N	4	5	5

$N = a \cdot b \cdot c = 4 \cdot 5 \cdot 5 = 100$

Note: In this example, we are required to form a 3-digit number using 5 digits. Since we cannot form a 3-digit number by placing the number 0 in the first cell, we have the option of placing 4 digits in the first cell. In the second cell, 5 digits can be used, and in the third cell, we use the digits used in the first two cells, resulting in 5 options.

Method 2:

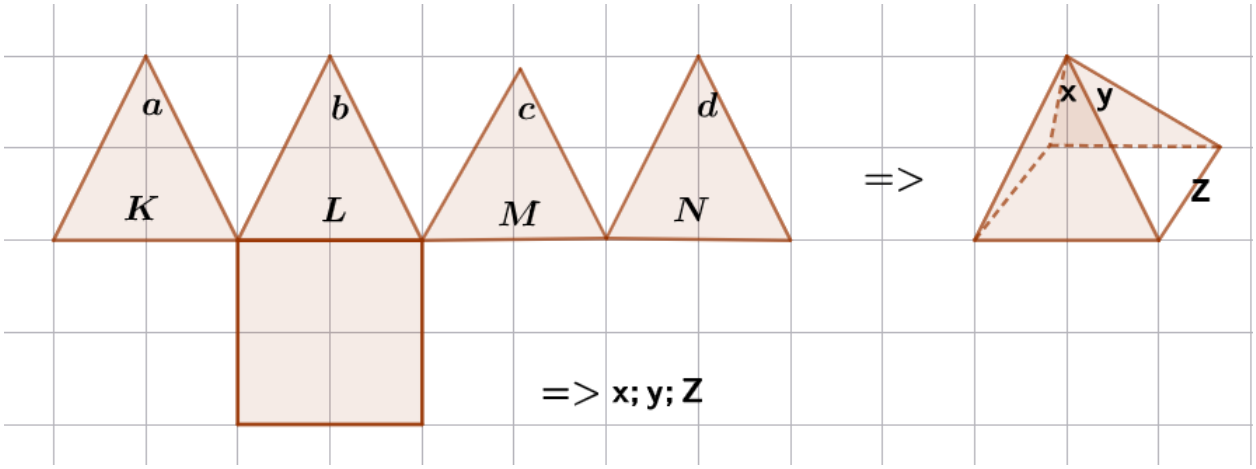
$$\left.\begin{matrix}1&0&0\\1&0&1\\1&0&3\\1&0&5\\1&0&7\end{matrix}\right\}5,\quad \left.\begin{matrix}1&1&0\\1&1&1\\1&1&3\\1&1&5\\1&1&7\end{matrix}\right\}5,\quad \left.\begin{matrix}1&3&0\\1&3&1\\1&3&3\\1&3&5\\1&3&7\end{matrix}\right\}5,\quad \left.\begin{matrix}1&5&0\\1&5&1\\1&5&3\\1&5&5\\1&5&7\end{matrix}\right\}5,\quad \left.\begin{matrix}1&7&0\\1&7&1\\1&7&3\\1&7&5\\1&7&7\end{matrix}\right\}5$$

In this order, by placing the numbers 3,5,7 in the first place, 25 three-digit numbers can be formed. So, let's calculate how many three-digit numbers we can form by placing 4 non-zero numbers in the first place.

$$25 \cdot 4 = 100$$

Answer: 100

18. Based on the drawing, determine the answer option corresponding to the question mark.



Solution:

If we imagine this distribution returning to its original state, the base M is exactly superimposed on the end c, the base Z is exactly superimposed on the end y. The base N is connected to the bases M and K on both sides. Then the end d of the base N is superimposed on the end x.

The conclusion is that: $x = d, y = c, Z = M$ is equal to.

Answer: $x = d, y = c, Z = M$

19. Ahmed finishes a job in 12 $hours$, while Mirali finishes it in 8 $hours$. After Ahmed started the job and worked for 4 hours, Mirali came to help. After they worked together for 2 $hours$, Ahmed left. Accordingly, in how many hours can Mirali finish the remaining job alone?

Solution:

$$Ahmed\ will\ finish\ the\ work\ in\ 12\ hours \rightarrow \frac{1}{12}\ work\ in\ 1\ hour$$

$$Mirali\ will\ finish\ the\ work\ in\ 8\ hours \rightarrow \frac{1}{8}\ work\ in\ 1\ hour$$

If Ahmed works alone for 4 hours: $4 \cdot \left(\frac{1}{12}\right) = \frac{1}{3}\ work$ work done.

Ahmed and Mirali worked together for 2 hours: $2 \cdot \left(\frac{1}{12} + \frac{1}{8}\right) = 2 \cdot \frac{2+3}{24} = \frac{5}{12}$

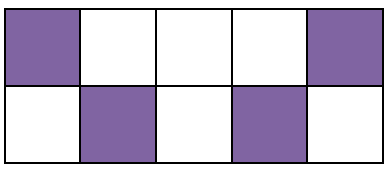
Total work done so far: $1 - \left(\frac{1}{3} + \frac{5}{12}\right) = 1 - \left(\frac{4}{12} + \frac{5}{12}\right) = 1 - \frac{9}{12} = 1 - \frac{3}{4} = \frac{1}{4}$

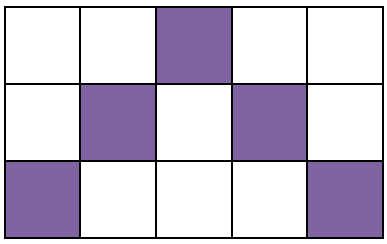
Mirali does $\frac{1}{8}$ of the work in 1 $hour$. The remaining time to complete the work is

$$\frac{\frac{1}{4}}{\frac{1}{8}} = 2hours.$$

Answer:2 hours

20. What percentage of the total number of small squares are the small squares colored in the given shape?





$$\boldsymbol{Percentage} = \frac{total\ number\ of\ cells}{number\ of\ colored\ cells} \times 100\%$$

There are 25 squares in total, 9 of which are painted and 16 are unpainted.

$$\begin{matrix} 25 \rightarrow 100\% \\ 9 \rightarrow X\% \end{matrix} \rightarrow X\% = \frac{9 \cdot 100\%}{25} = 36\%$$

Answer: 36%

21. The following table is given:

#	1	2	3	4
1	3	4	1	2
2	4	1	2	3
3	1	2	3	4
4	2	3	4	1

For example,$1\#1 = 3$ or $2\#1 = 4$

If $a^2 = a\#a, a^3 = a\#a\#a = (a\#a)\#a$ then , 4^{100} =?

Solution:

$4^{100} \rightarrow \underbrace{4\#4\#4\#\ldots\#4\#4}_{100ta} \rightarrow$ each pairwise, $4\#4 = 1$ expression yields 50.

$\underbrace{1\#1\#1\#\ldots\#1\#1}_{50ta} \rightarrow$ each pairwise, $1\#1 = 3$ expression yields 25.

$\underbrace{3\#3\#3\#\ldots\#3\#3}_{25ta}$ each pairwise, $3\#3 = 3$ is formed. We have one more 3, using $3\#3 = 3$, to $4^{100} = 3$

Answer:3

22. Points A (15), B (23), and D (35) are given on a coordinate ray. Determine what fraction of the length of the segment $\overline{BD}$ is the segment length $\overline{AD}$.

Solution:

$$\frac{\overline{BD}}{\overline{AD}} = ?$$

$$\overline{AD} = 35 - 15 = 20$$

$$\overline{BD} = 35 - 23 = 12$$

$$\frac{\overline{BD}}{\overline{AD}} = \frac{12}{20}$$

Answer: $\frac{12}{20}$

23. Murodjon drove his new car from Andijan to Tashkent at a speed of 180 km/h. The car was caught on radar and had to pay a fine. Then he returned to Andijan at a speed of 60 km/h. Find his average speed on the way there and back.

Solution:

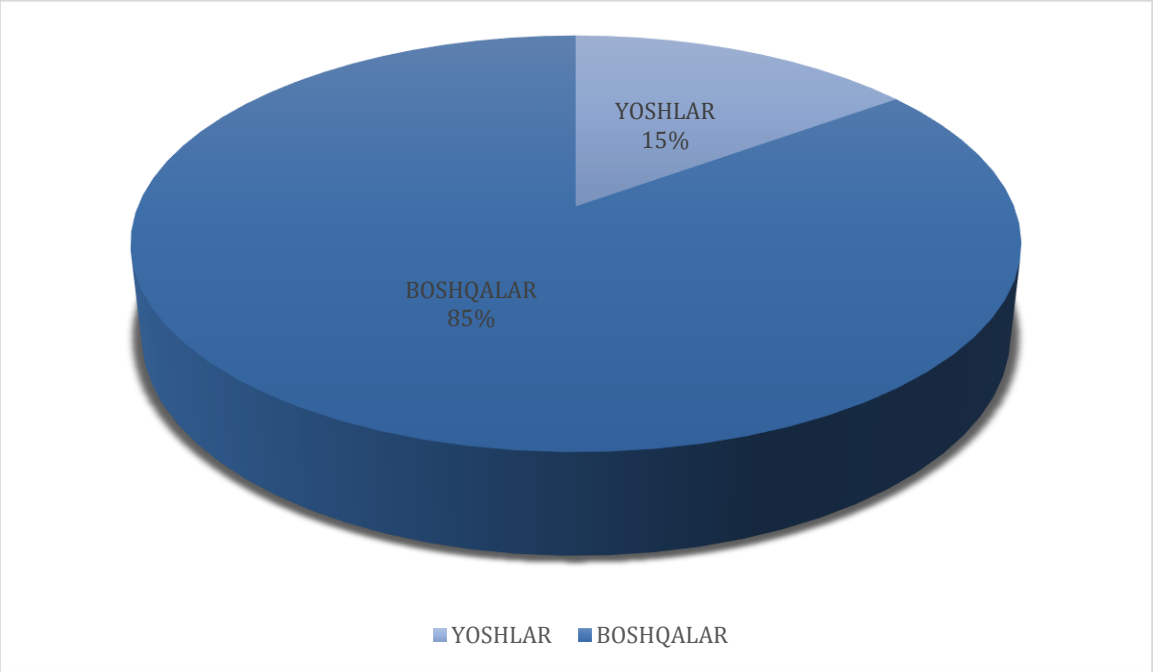
$$v_{average} = \frac{2v_1 \cdot v_2}{v_1 + v_2}$$

$$v_{average} = \frac{2 \cdot 180 \cdot 160}{180 + 160} = \frac{120 \cdot 180}{240} = 90$$

Answer: $90km/h$

24. It is known that the ratio of young people to the rest of the population in Uzbekistan is $\frac{3}{17}$. Accordingly, in a pie chart showing the proportion of young people and other population in Uzbekistan, how many degrees is the part reserved

for young people?



Solution:

$$3x + 17x = 360^0$$

$$20x = 360^0$$

$$x = \frac{360^0}{20} = 18^0$$

$$3x = 3 \cdot 18^0 = 54^0$$

Answer: 54^0

25. For how many natural values of n will the expression (3n+12)/(n+2) be a natural number?

Solution:

We take the term as an exponent, and assign a value to n that results in a natural number.

$$\frac{3n+12}{n+2} = \frac{3(n+2)+6}{n+2} = 3 + \frac{6}{n+2}$$

To make the expression $3 + \frac{6}{n+2}$ a natural number, we assign a value to n,

$$n = 1 \rightarrow 3 + \frac{6}{n+2} = 3 + \frac{6}{1+2} = 3 + 2 = 5$$

$$n = 2 \rightarrow 3 + \frac{6}{n+2} = 3 + \frac{6}{2+2} = 3 + \frac{6}{4} = 4\frac{1}{2}$$

$$n = 3 \to 3 + \frac{6}{n+2} = 3 + \frac{6}{3+2} = 3 + \frac{6}{5} = 4\frac{1}{5}$$

$$n = 4 \to 3 + \frac{6}{n+2} = 3 + \frac{6}{4+2} = 3 + 1 = 4$$

Answer: 2 solutions: $n = 1, n = 4$.

26. Do the addition:

$$8m^2 66dm^2 37cm^2 + 21m^2 48dm^2 90cm^2 = ?$$

Solution:

We can convert each to m^2.

$$8m^2 66dm^2 37cm^2 = 8m^2 + 66 \cdot 10^{-2}m^2 + 37 \cdot 10^{-4}m^2$$

$$= (8 + 0.66 + 0.0037)m^2 = 8.6637m^2$$

$$21m^2 48dm^2 90cm^2 = 21m^2 + 48 \cdot 10^{-2}m^2 + 90 \cdot 10^{-4}m^2$$

$$= (21 + 0.48 + 0.009)m^2 = 21.489m^2$$

$$8.6637m^2 + 21.489m^2 = 30.1527m^2$$

Answer: $30.1527m^2$

27. The terms of using MY Taxi service in city A are as follows;

Initial amount: $5000\ soums$

For each km within $0 - 5km$: $800\ soums$

For each km within $5 - 10km$: $600\ soums$

For each km beyond $10km$: $500\ soums$

For each minute of waiting for a taxi: $400\ soums$

Accordingly, how much should a passenger pay for a taxi if he goes from city A to city B, which is $16km$ away, waits for the taxi for $20\ minutes$, and then returns to city A?

Solution:

1. $S_{0km} = 5000soums \to starting\ price\ 5000soums$
2. $S_{(0-5)km} = 800soums \to for\ 5\ km\ of\ walking\ \to 5\ km \cdot 800soums$
3. $S_{(5-10)km} = 600soums \to for\ the\ next\ 5km \to 5km \cdot 600soums$
4. $S_{10km} = 500soums \to for\ every\ km\ over\ 10\ km \to 6km \cdot 500soums$
5. $S_{to\ wait} = 400soums$

$$x - payment\ amount?$$

$$x = 5000 + 2 \cdot (5 \cdot 800 + 5 + 600 + 6 \cdot 500) + 20 + 400 = 33000$$

Answer: 33000*so'm*

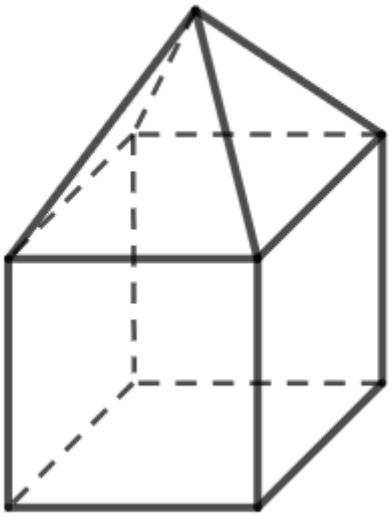
28. Calculate: $1 - \frac{\frac{2}{5}}{\frac{4}{7} - \frac{1}{3}} = ?$

Solution:

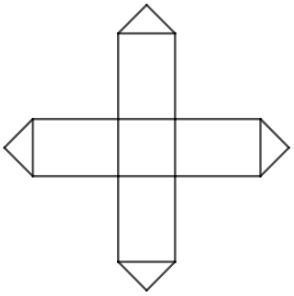
$$1 - \frac{\frac{2}{5}}{\frac{4}{7} - \frac{1}{3}} = 1 - \frac{\frac{2}{5}}{\frac{12-7}{21}} = 1 - \frac{\frac{2}{5}}{\frac{5}{21}} = 1 - \frac{2}{5 \cdot \frac{21}{5}} = 1 - \frac{2}{21} = \frac{21-2}{21} = \frac{19}{21}$$

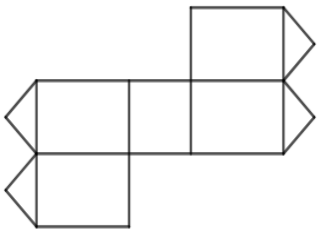
Answer: $\frac{19}{21}$

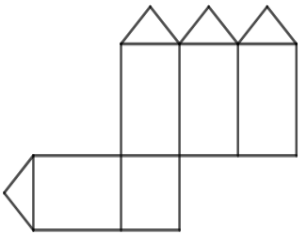
29. Given the following form:

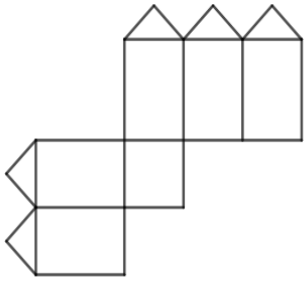


Which of the following is not a distribution of this shape?

A) 

B) 

C) 

D) 

Solution:

In this question, we will use the method of leaving the variants.

A) If this spread is reassembled, the requested shape will return to its original state.

B) If this spread is reassembled, the requested shape will return to its original state.

C) If this spread is reassembled, the requested shape will return to its original state.

D) If this spread is reassembled, the requested shape will not return to its original state, because one side will overlap.

Answer: D

30. 392 athletes need to undergo medical examination at the sports complex. On the first day, $\frac{4}{7}$ of the athletes were examined, and on the second day, $\frac{2}{3}$ of the remaining athletes were examined. How many more athletes need to be examined?

Solution:

Total: 392. $392 \cdot \left(\frac{4}{7}\right) = 56 \cdot 4 = 224$

$392 - 224 = 168$ not passed

Day 2: $168 \cdot \left(\frac{2}{3}\right) = 56 \cdot 2 = 112$

$168 - 112 = 56$ left.

Answer: 56

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