

1) Peter took marbles to school. During first break he lost one quarter of them. During second break he lost 8 more and had 16 left after second break. How many marbles did he take to school?

- A) 96 B) 72 C) 56 D) 18 E) 32

$32 - 8 = 24$

$24 - 8 = 16$

2) A is a number greater than 20 and less than 30. B is a number greater than 200 and less than 300. What is the smallest difference there could be between A and B?

- A) 270 B) 278 C) 170 D) 180 E) 172

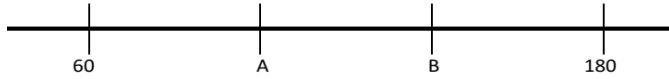
Smallest number between 200 and 300: 201

Biggest number between 20 and 30: 29

$201 - 29 = 172$

3) Four numbers are equally spaced on a number line.

Calculate the sum of A and B.



- A) 240 B) 255 C) 210 D) 300 E) 120

$180 - 60 = 120$

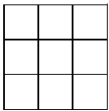
$120 \div 3 = 40$

$A = 60 + 40 = 100$

$B = 100 + 40 = 140$

$A + B = 100 + 140 = 240$

4) Find the number of squares, of all sizes, in the figure.



- A) 9 B) 10 C) 13 D) 14 E) 15

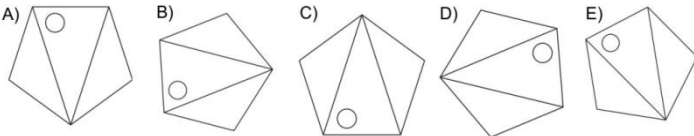
$1 \times 1 = 9 \text{ squares}$

$2 \times 2 = 4 \text{ squares}$

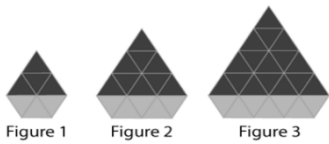
$3 \times 3 = 1 \text{ squares}$

$Total = 9 + 4 + 1 = 14$

5) Which one of the following figures is the odd one out?



6) Joy uses some identical triangular butter biscuits (grey) and chocolate biscuits (black) to form some figures that follow a pattern as shown.



How many chocolate biscuits will be used to build Figure 6?

- A) 24 B) 36 C) 42 D) 49 E) 52

The question only concerns only the chocolate number of biscuits. Use uristics and draw a table.

<i>Figure number</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>6</i>
<i>Number of chocolate biscuits</i>	<i>4</i>	<i>9</i>	<i>16</i>	

One can immediately see the square numbers establishing.

The Rule therefore is (figure number + 1) squared

Therefore, for Figure 6 it would be: (6 + 1) squared = 7 x 7 = 49

7) Gail wants 150 pieces of ribbon for a party. Each length of ribbon is 40 cm. However, the ribbon is sold only in rolls of 5m. How many rolls of ribbon will Gail need to produce 150 little ribbons?

- A) 11 B) 12 C) 13 D) 14 E) 15

How many ribbons are produce by one roll?

$500 \div 40 = 12,5$. This must be rounded to 12 ribbons.

This means that each roll can produce 12 ribbon lenth.

Therefore, $150 \div 12 = 12,5$

This means you need 1 more than 12, which is 13.

8) At first, Shop A had 156 kg of rice and Shop B had 72 kg of rice. After each shop sold the same quantity of rice, the amount of rice that Shop A had was 4 times that of Shop B.

How many kilograms of rice did Shop A sell?

- A) 30 B) 40 C) 42 D) 44 E) 50

The answer can be obtained by trial and improvement as follows:

$156 - 30 = 126$ and $72 - 30 = 42$

$156 - 40 = 116$ and $72 - 40 = 32$

$156 - 42 = 114$ and $72 - 42 = 30$

$156 - 44 = 112$ and $72 - 44 = 28$

$112 = 4 \times 28$

The answer is therefore 44 kilograms

Using Algebra: $156 - x = 4y$ and $72 - x = y$

Therefore, $156 - 72 = 4y - y$

$Y = 28$

Therefore, $x = 72 - 28 = 44$

9) $99 + 98 - 97 + 96 - 95 + \dots + 6 - 5 + 4 - 3 + 2 - 1 = ?$

- A) 148 B) 118 C) 99 D) 50 E) 49

$= 99 + 98 - 97 + 96 - 95 + \dots + 2 - 1$

$= 99 + 1 + 1 + \dots + 1$

$\frac{98}{2} = 49$

$= 99 + 49$

$= 148$

10) Part of the chart below is missing. What is the number of the row that contains 248?

Row	Column 1	Column 2	Column 3
1	6	8	10
2	12	14	16
3	18	20	22
4	24	26	28
5	30	32	34
	36	38	"
	"	44	

- A) 39 B) 40 C) 41 D) 42 E) 44

Column 1: Rule $x \times 6$

Column 2: Rule $x \times 6 + 2$

Column 3: Rule $x \times 6 + 4$

Test each rule: Only One will work: $(248 - 2) \div 6 = 41$

11) Jim bought 2 more pairs of shorts than shirts and paid a total of R124. Each shirt costs R8 and each pair of shorts costs R12.

How many shorts did Jim buy?

- A) 5 B) 7 C) 9 D) 11 E) 12

Two shorts cost R24. We now subtract: $R124 - R24 = R100$. Now the number of shorts and shirts are equal.

Together a short and shirt cost R20

Therefore, $100 \div 20 = 5$. So the cost of 5 shirts and 5 pants cost R100.

Number of shorts = $5 + 2 = 7$

12) Place the numbers 1 to 9 so that each row, column and diagonal adds up to same number. Use each number exactly once.

Find the value of $a + b + c + d + e + f$.

a	b	c
9	5	1
d	e	f

- A) 35 B) 30 C) 45 D) 25 E) 15

$$9 + 5 + 1 = 15$$

$$a + b + c = 15$$

$$d + e + f = 15$$

$$\text{Total} = 30$$

13) In a bag full of small balls, $\frac{1}{3}$ of these balls are green, $\frac{1}{6}$ are blue, $\frac{1}{12}$ are yellow and the remaining 25 white.

How many balls are blue?

- A) 10 B) 20 C) 30 D) 40 E) 60

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{12} = \frac{7}{12}$$

$$1 - \frac{7}{12} = \frac{5}{12}$$

$$\frac{5}{12} \text{ of all is } 25$$

$$\frac{25}{5} = 5$$

$$5 \times 12 = 60 \text{ (All)}$$

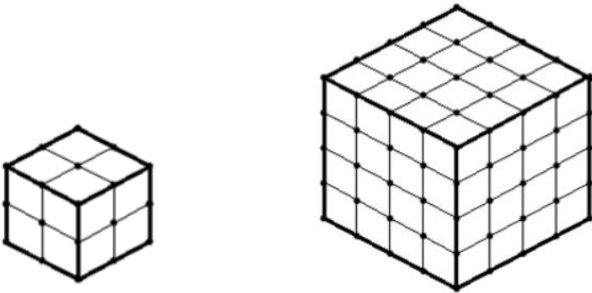
$$60 \div 6 = 10$$

14) It takes one man one day to dig a hole of $2\text{m} \times 2\text{m} \times 2\text{m}$.

How long would it take him, working at the same rate, to dig a hole of $4\text{m} \times 4\text{m} \times 4\text{m}$?

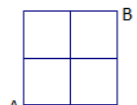
- A) 2 days B) 4 days C) 6 days D) 8 days E) 10 days

Solution:



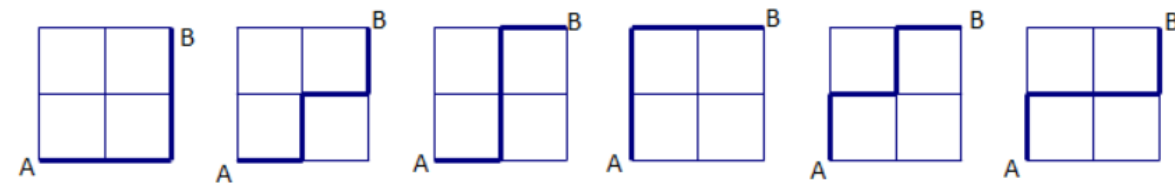
8 of the smaller cube would make up one of the larger cube.

15) How many ways are there to get from A to B, if you move only to the right and upwards?



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

Solution

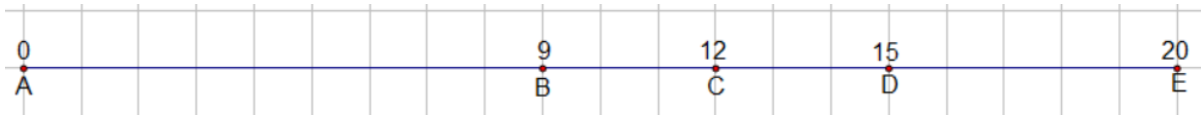


16) The points A, B, C, D, and E are located on a straight line, in order. The distances from; A to E is 20cm, from A to D is 15cm, from B to E is 11cm, and C is halfway between B and D.

What is the distance from A to C?

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

Solution



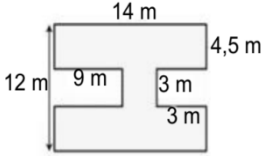
17) The product of the digits in the number 182 is $1 \times 8 \times 2 = 16$. For how many 3-digit numbers is the product of their digits 16?

- A) 9 B) 12 C) 15 D) 16 E) 18

Numbers are:

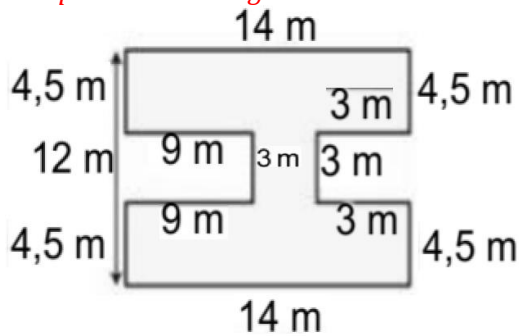
- 128 182 218 281 812 821
 144 414 441
 244 424 442

18) What is the perimeter of the geometric shape given alongside?



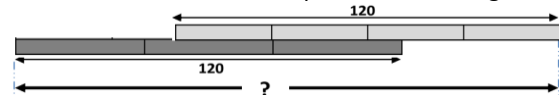
- A) 52 B) 56 C) 60 D) 64 E) 76

Complete the missing sides.



$14 + 4,5 + 3 + 3 + 4,5 + 14 + 4,5 + 9 + 3 + 9 + 4,5 = 76$

19) The two strips of wood in the sketch are both 120 cm long and they overlap each other. The one is divided in quarters and the other in thirds. What is the possible total length as indicated in the sketch?



- A) 240 B) 170 C) 160 D) 150 E) 130

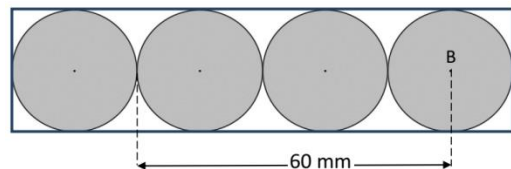
Each piece of the bottom piece is $120 \div 3 = 40\text{cm}$

Each piece of the Top piece is $120 \div 4 = 30\text{cm}$

Total Length: $40 + 40 + 40 + (30 - 10) + 30 = 170\text{cm}$ or

Total Length: $30 + 30 + 30 + 30 + (40 - 30) + 40 = 170\text{cm}$

20) Four identical circles fit inside a rectangle. B is the center point of the circle. What is the perimeter of the rectangle?



- A) 240mm B) 120mm C) 96mm D) 24mm E) 12mm

Half of a diameter: $60\text{mm} \div 5 = 12\text{mm}$

Diameter: $12\text{mm} \times 2 = 24\text{mm}$

Length of rectangle: $24 \times 4 = 96\text{mm}$

Width of rectangle: Equal to diameter: 24

Perimeter: $2(L + W) = 2(96\text{mm} + 24\text{mm}) = 240\text{mm}$