

12 84

13 9.00

14 18

15 27

Section 2 : Section B Integers - 10 Questions

16 24

17 72

18 481

19 55

20 576

21 16

22 37

23 21

24 5

25 188

TEST

AMO Grade 5 Mock Test Paper 4

SOLUTIONS

SECTIONS

1. Section A MCQs - 15 Questions
2. Section B Integers - 10 Questions

Section 1 : Section A MCQs - 15 Questions

1

The sum of the first set of numbers is $888 + 666 + 444 + 111 = 2109$.

The sum of the second set of numbers is $555 + 333 + 222 + 777 = 1887$.

The difference is $2109 - 1887 = \mathbf{222}$.

2

The area of the original rectangle is $8 \times 12 = 96 \text{ cm}^2$. When it is folded in half, the area is cut in half and $96 \div 2 = 48 \text{ cm}^2$. When the paper is again folded in half the area is once again cut in half and $48 \div 2 = 24 \text{ cm}^2$.

3

$$2 \times (9 + 49 + 25 + 9 + 2) = \mathbf{188}$$

4

—

We know that 85 days equals 12 weeks and 1 day. To maximize the number of Fridays, make the first day a Friday. The remaining 84 days will have 12 Fridays, so the greatest number of Fridays that could occur is $12 + 1 = 13$.

5

$$\begin{aligned} 117 + 104 + 91 + 78 + 65 + 52 + 39 + 26 + 13 \\ = (117 + 13) + (104 + 26) + (91 + 39) + (78 + 52) + 65 \\ = 130 \times 4 + 65 = \mathbf{585} \end{aligned}$$

6

Since the thousands digit is twice the ten thousands digit, the ten thousands digit can only be 1, 2, 3 or 4. Create a table of values for each case.

ten thousands	thousands	hundreds	tens	ones
1	2			
2	4			
3	6			
4	8			

From the hundreds digit is 50% more than the thousands digit, we get the following possibilities which leads to an impossible case where the ten thousands digit is 4.

ten thousands	thousands	hundreds	tens	ones
1	2	3		
2	4	6		
3	6	9		
4	8	12		

From the tens digit is 1 more than the ten thousands digit, we get the following possibilities which leads to an impossible case where the ten thousands digit is 1.

ten thousands	thousands	hundreds	tens	ones
1	2	3	2	
2	4	6	3	
3	6	9	4	

From the ones digit is 2 more than the tens digit, we get the following possibilities which leads to an impossible case where the ten thousands digit is 3.

ten thousands	thousands	hundreds	tens	ones
2	4	6	3	5
3	6	9	4	6

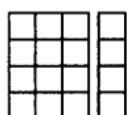
Therefore, Tim's PIN code is 24635 and $\frac{24635}{65} = 379$.

7

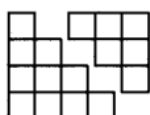
Maximize the perimeter by cutting along as many tile edges as possible.

In order to cut along the most possible tile edges, the cut should not be directly across or down. By making an indirect cut, the perimeter is maximized. The cut along the most possible tile edges will be 10 cm. Since the cut will create a new edge for each figure, it will add $10 \times 2 = 20$ cm to the original perimeter. Thus, the greatest combined perimeter of the two pieces will be $16 + 20 = 36$ cm.

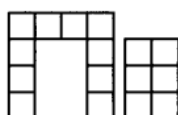
Possible cuts:



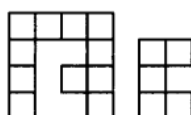
P = 14 P = 10
Total P = 24



P = 16 P = 12
Total P = 28



P = 22 P = 10
Total P = 32

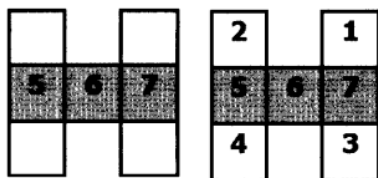


P = 24 P = 12
Total P = 36

8

Since we wish to have the largest possible product for the three numbers in the grey row, try using 5, 6 and 7.

The sum of the numbers in the first column must equal the sum of the numbers in the second column. Therefore, the sum of the two remaining numbers in the first column must be 2 more than the sum of the two missing numbers in the second column.



The missing numbers in the first column must be 2 and 4 while the two missing numbers in the second column must be 1 and 3.

The diagonals also have the same sum ($2 + 6 + 3 = 11$). One possible arrangement for the four remaining numbers can be seen in the second diagram. The product of the numbers in the grey row is $5 \times 6 \times 7 = \mathbf{210}$.

9

Tom can paint $\frac{1}{12}$ of a classroom in one hour. Jerry can paint $\frac{1}{4}$ of a classroom in one hour. Together, they can paint $\frac{1}{4} + \frac{1}{12} = \frac{1}{3}$ of a classroom in one hour. This means to paint the entire classroom, they need $3 \times 1 = \mathbf{3 \text{ hours}}$.

10

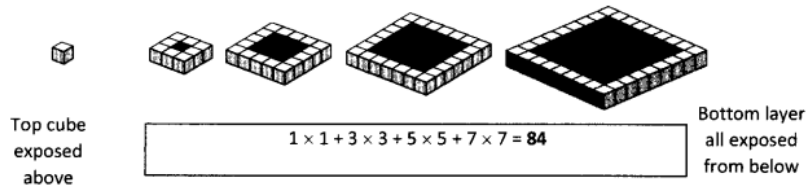
Factor 32 and 36: $32 = 2^5$ and $36 = 2^2 \times 3^2$ so the common multiple is $2^5 \times 3^2 = 288$. The greatest 3-digit multiple of 288 is $288 \times 3 = \mathbf{864}$.

11

The common multiple of these numbers is their product: $(3 \times 5 \times 11) \times (2 \times 7)$. Regroup this as $(3 \times 7 \times 11) \times (2 \times 5) = 231 \times 10 = 2310$. This is the smallest multiple of all 5 numbers. Then, check multiples of 2310 to match Carrie's rule that it has a 9 digit but not a 6 digit: 2310, 4620, 6930, and 9240. Hence, the number they chose is 9240, and its last 3 digits are **240**.

12

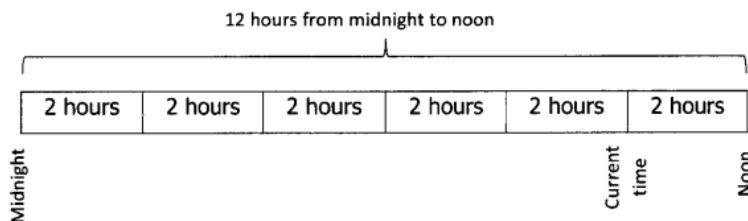
The layers of the structure have been separated. None of the cubes in the top layer and bottom layer is completely surrounded by other cubes. The tops of the cubes that were completely surrounded by other cubes are shaded.



[Notice how the shading of one layer matches the number of cubes in the layer above it.]

13

There are 12 hours from midnight to noon. Since the number of hours that has passed was five times the number of hours that remain until noon, divide the total time into six equal units. Since $12 \div 6 = 2$ hours, the time passed is $5 \times 2 = 10$ hours and the time the clock showed 1 hour ago is **9:00**.



14

The product of the ones digits in AB and BA results in the ones digit of A45B or B×A=B. Hence A must be 1. The product $1B \times B1 = 145B$ is greater than 1450, so B must be 8 or 9. Only B=8 satisfies the multiplication $18 \times 81 = 1458$ and AB=**18**.

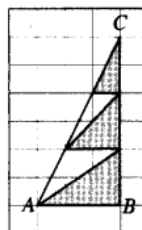
15

Find the area of each shaded triangle using $A = (1/2) \times \text{base} \times \text{height}$. The base and height of a right triangle are the legs of the triangle. Let x be the length of a small square in the diagram. The total area of the three shaded triangles is

$$\frac{2x \times x}{2} + \frac{2x \times 2x}{2} + \frac{2x \times 3x}{2} = 6x^2 = 18.$$

$$x^2 = 18 \div 6 = 3$$

The area of $\triangle CAB = \frac{6x \times 3x}{2} = 9x^2 = 9 \times 3 = 27 \text{ cm}^2$.



Section 2 : Section B Integers - 10 Questions

16

Strategy: Use place value and number sense to problem solve.

Since the problem asks for the least sum possible, start with the hundred-thousands place and assign B the least possible value, which is 1, since $B \neq 0$. Assign the letters in the ten-thousands place with the least remaining unused digits. Since E repeats in the tens place, assign $E = 0$. Then assign 2, 3, and 4 to I, A, and U in some order. As a result, the next least available digits for T and R are 5 and 6, respectively. Therefore, the last three digits of the least possible sum 512024 are **024**.

$$\begin{array}{r} 105506 \\ 125506 \\ 135506 \\ + 145506 \\ \hline 512024 \end{array}$$

17

Six years ago:

Hezekiah:	1 unit			
Jethro:	1 unit	1 unit	1 unit	1 unit

Now:

Hezekiah:	1 unit	6			
Jethro:	1 unit	1 unit	1 unit	1 unit	6

Since Jethro is now 3 times as old as his son Hezekiah, then

$$4 \text{ units} + 6 = 3 \times (1 \text{ unit} + 6) \text{ or}$$

$$4 \text{ units} + 6 = 3 \text{ units} + 18$$

$$4 \text{ units} - 3 \text{ units} = 18 - 6$$

$$1 \text{ unit} = 12.$$

Thus, Hezekiah is $12 + 6 = 18$ years old and Jethro is $4 \times 12 + 6 = 54$ years old. the sum of Jethro's and Hezekiah's present ages is $54 + 18 = \mathbf{72}$.

18

From the table below, we can notice that the differences are consecutive multiples of 4.

Figure	Number of dots	Difference
Figure 1	1	
Figure 2	5	+4
Figure 3	13	+8
Figure 4	25	+12
Figure 5	41	+16
Figure 6	61	+20

By listing the number of dots in the figures in the same way, we will find that there are **481 dots** in Figure 16.

19

$$1980 = \underline{2} \times \underline{2} \times \underline{3} \times \underline{3} \times 5 \times 11$$

The least possible value of k will be a product of 5 and 11 as each of them does not form a pair of square numbers.

Thus, $k=55$

20

Strategy: Find multiples of 4 that are "small" 3-digit numbers.

The word SUM is a 3-digit multiple of 4 since it is the result of adding 4 of the same number. The only possible value for A is 1 or 2. Let $A = 1$. If $ADD = 122$, then $4 \times 122 = 488$ which means $U = M$. But $U \neq M$, so $ADD \neq 122$. If $ADD = 133$, then $4 \times 133 = 532$. This is impossible, otherwise, $U = D$. If $ADD = 144$, then $4 \times 144 = 576$. This is possible. Since we want the least number $SUM = \mathbf{576}$.

21

Factor 80 and apply the principle that the least surface area occurs when the brick is most regular [that is, most cube-like].

The least surface area occurs when the brick is most like a cube. The prime factors of 80 are $2^4 \times 5$. Therefore, the dimensions of the most cube-like solid will be $4 \times 4 \times 5$. The faces with the smallest area will have dimensions 4×4 and their areas will each be **16** square units.

[Note: The surface area of the brick will be $2(4 \times 4 + 4 \times 5 + 4 \times 5) = 112$ square units.]

22

Let the sum of the numbers along each line be S and the numbers on the vertices (circles) of the triangle be a , b and c .

Next, let us add all the numbers along 3 lines. We can notice that the numbers 1 through 12 except a , b and c were added only once whereas a , b and c were added twice. Thus,

$$3S = (1 + 2 + 3 + \cdots + 12) + a + b + c = 78 + a + b + c$$

$$S = \frac{78 + a + b + c}{3}$$

The largest possible value of S is obtained when $a + b + c$ is the largest possible.

Hence S must be $\frac{78+10+11+22}{3} = \frac{111}{3} = \mathbf{37}$.

23

Number of lines	The largest number of parts	Difference
1	2	
2	4	+2
3	7	+3
4	11	+4

We can check that the largest number of parts is indeed $(11 + 5) = 16$ when a circle is divided by 5 lines. Hence, when a circle is divided by **21 lines**, the largest number of parts obtained is 232.

24

The least possible number whose only digit is the number 1, and is greater than 41, is 111. However, 111 is not divisible by 41 and neither is 1111. When 11,111 is divided by 41 the result is 271, which means 11,111 is the least multiple of 41 whose only digit is the number 1 and it has **5** digits.

25

Make a list of the possible numbers to be used and cross them off once used: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

Notice that the only possible value for G is 1 so cross off 1 from the list. We want the greatest possible GOO so let D = 9 which means that O = 8. This means that $U + U = 2U$ must be less than 10. Hence O = 8 and U = 4.

Thus, O=8, DUCK=9435 or 9436 and GOOSE=18870 or 18872. The greatest value of GOO is **188**.