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Mathematics Short Answer Problems

International Mathematics and Science  
Olympiad (IMSO)  
for Primary School 2004

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Jakarta, November 29 - December 3, 2004

**Instructions:**

- \* Write down your name on every page.
- \* Answer all 25 questions.
- \* You have 60 minutes to work on this test.
- \* Write your answer in the boxes provided.

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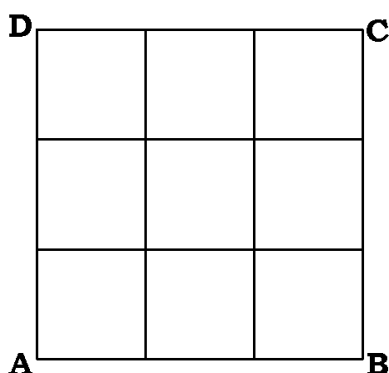
Name : .....  
Country : .....

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1. A pole is 156 cm high. It casts a shadow of length 234 cm. Find the length of the shadow cast by a 104 cm-high pole.

Answer:

2. The square  $ABCD$  is divided into 9 smaller squares as shown in the figure. The perimeter of  $ABCD$  is 360 m. Find the perimeter of one smaller square.



Answer:

3. A farmer has some goats and chickens. He counts 110 legs and 76 eyes. How many goats does he have?

Answer:

Name : .....  
Country : .....

4. The table shows Andi's grades for Test 1 and Test 2 in Mathematics, Language and Science.

	MATHEMATICS	LANGUAGE	SCIENCE
TEST 1	5	6.5	7
TEST 2	6.5	8	8.5

In which subject does he show the best improvement in terms of percentage, from Test 1 to Test 2?

Answer:

5. Complete the magic square so that the vertical sums, horizontal sums and diagonal sums are all equal.

4		
	1	
	5	-2

6. Nasir draws 5 straight lines on a piece of paper. What is the maximum number of intersection points can Nasir make?

Answer:

Name : .....  
Country : .....

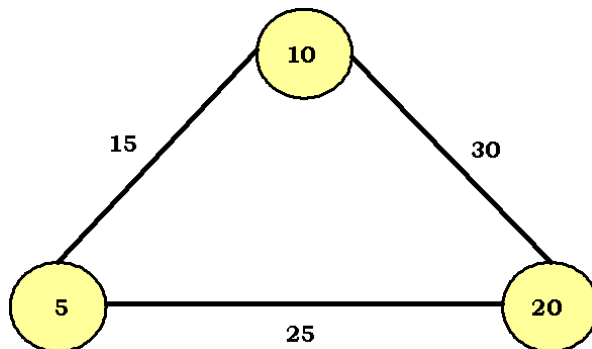
7. Ade and Tomi are talking about money. Ade says, "If you give me 1,000 rupiahs, our money will be equal". Tomi says, "If you give me 1,000 rupiahs, my money will be twice as much as your money". How much money do they have altogether?

Answer:

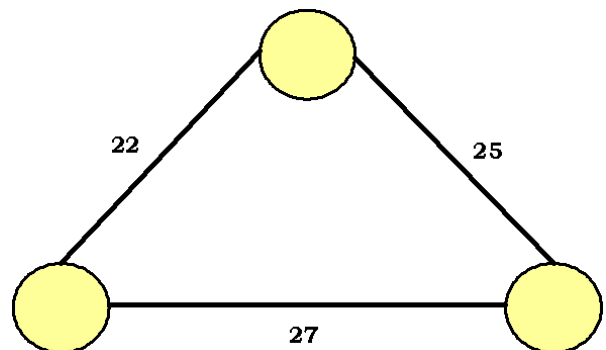
8. A swimming pool is 10 m long and 4 m wide. The shallow end is 1 m deep. The bottom slopes evenly to the other end, where it is 2 m deep. Find the volume of the pool in  $\text{m}^3$ .

Answer:

9. In the figure below, the number assigned to the edge connecting two circles describes the sum of two numbers in the circles.

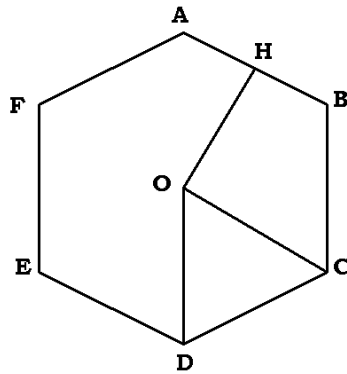


Fill all circles with the appropriate numbers following the above rule.



Name : .....  
Country : .....

10. The figure below shows paths in a garden.  $ABCDEF$  is a regular hexagon with center  $O$ .  $H$  is the midpoint of side  $AB$ . What is the shortest way to go from  $H$  to  $E$  along the paths?



Answer:

11. In a birthday party, all the children are given candies. If each child gets 5 candies, there would be 10 candies left. If each child gets 6 candies, 2 more candies are needed. How many candies are there?

Answer:

12. A natural number has the following conditions:

- \* When this number is divided by 4, the remainder is 3.
- \* When this number is divided by 3, the remainder is 2.
- \* When this number is divided by 2, the remainder is 1.

Find the smallest number that satisfies the above conditions.

Answer:

Name : .....  
Country : .....

13. Jones, Jennifer, Peter and Ruby are playing a game. Jones thinks of a 3-digit number without saying out and the others guess what number it is.

- \* Jennifer says : "I guess it is 765".
- \* Peter says : "I think it may be 364".
- \* Ruby says : "Hmmm.... I choose 784".

Then Jones answers: " Each of the numbers you guess coincides with the number in my mind in exactly two digits." What is this number?

**Answer:**

14. The distance from Ani's house to her school is 800 m. If Ani starts walking from her house at 06:35, she arrives at her school at 07:00.

Ani's running speed is five times of her walking speed. If she wants to run to school and arrives there at 07:00, at what time must she leave her house?

**Answer:**

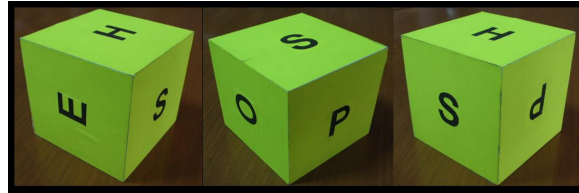
15. Put the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 in the boxes below to make a correct sum. Use each number exactly once.

$$\begin{array}{r} \square \square \square \\ + \square \square \square \\ \hline \square \square \square \square \end{array}$$

Name : .....

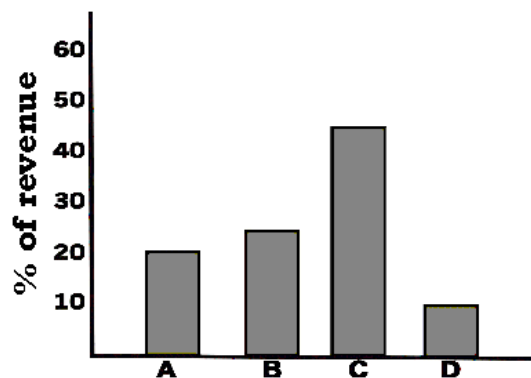
Country : .....

16. The following are different views of the same cube. What is the letter on the opposite side of the letter *H*?



Answer:

17. The graph below shows the revenue from selling products *A*, *B*, *C*, and *D*. If the revenue from selling the product *A* is 400,000 rupiahs and the unit price of the product *D* is 10,000 rupiahs, find the number of product *D* sold.



Answer:

18. There are three consecutive even numbers. Seven times the smallest number equals five times the largest number. Find the sum of the three numbers.

Answer:



Name : .....  
Country : .....

19. The letter in each square represents a number. The sum of the numbers is shown alongside a row or beneath a column, with the exception of the column with an  $X$ . Find the value of  $X$ .

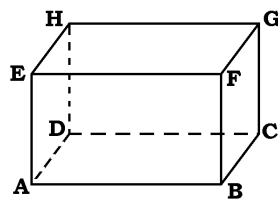
<b>A</b>	<b>B</b>	<b>C</b>	<b>C</b>	96
<b>C</b>	<b>A</b>	<b>A</b>	<b>A</b>	92
<b>B</b>	<b>B</b>	<b>B</b>	<b>C</b>	140
<b>A</b>	<b>C</b>	<b>A</b>	<b>B</b>	108
108	$X$	108	96	

Answer:

20. Find the smallest positive integer  $X$  such that the sum of the digits of  $X$  and of  $X + 1$  are both divisible by 7.

Answer:

21. What is the maximum number of different triangles that can be formed by using the points  $A, B, C, D, E, F, G$ , and  $H$ ?



Answer:

Name : .....  
Country : .....

22. Find a number which satisfies the following conditions:

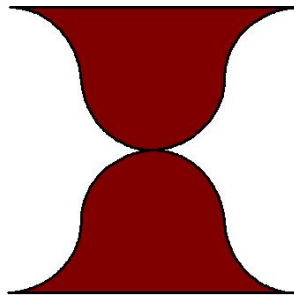
- \* The number is between 8500 and 8700.
- \* The sum of its digits is 21.
- \* The number is divisible by 4.
- \* The number contains different digits.

**Answer:**

23. Four different prime numbers  $A, B, C, D$  satisfy expression  $A \times (B \times C \times D - 1) = 2000$ .  
Find  $A + B + C + D$ .

**Answer:**

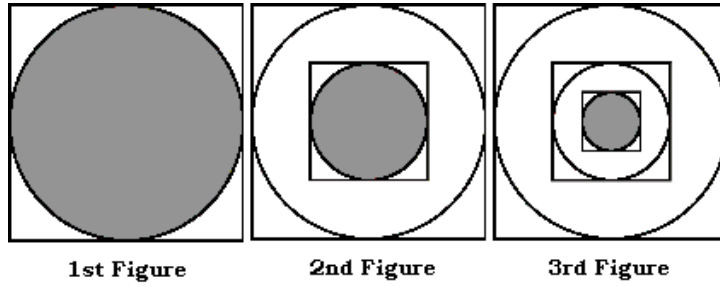
24. The shaded area is bounded by two semi-circles and four quarter circles of radius 1 cm each.  
Find the area of the shaded figure in  $\text{cm}^2$ .



**Answer:**

Name : .....  
Country : .....

25. In the following figures, the area of each large square is  $1 \text{ cm}^2$ . The area of smaller square in the  $2^{\text{nd}}$  figure is  $\frac{1}{4}$  of the larger square's area. The area of the smallest square in the  $3^{\text{rd}}$  figure is  $\frac{1}{16}$  of the largest square's area. We continue with this pattern. Find the area, in  $\text{cm}^2$ , of the shaded circle in the  $5^{\text{th}}$  figure.



Answer: