# THE GRAMMAR SCHOOL

# ENTRANCE EXAMINATIONS

# 18 MARCH 2019

| SUBJECT : | MATHEMATICS |
|-----------|-------------|
| TIME : | 1 HOUR AND 30 MINUTES |

**Instructions to students.**

1.  Write your number on the first page.

2.  You are not allowed to use any kind of a calculator.

3.  Using a pen is preferable, but if you wish you can use a pencil.

4.  Correction fluid (tippex) or tape is not allowed

5.  You are not allowed to talk to one another.

6.  Read the instructions of each question carefully.

7.  If you don't know a question, go to the next one.

8.  Show all the workings.

9.  The examination consists of 20 questions and you must answer **ALL** of them.

10. The total number of marks is 100.

1. Evaluate the following:

(a) $(88 + 3 \times 4) \div 4 - 20 =$

Answer: _____ (4)

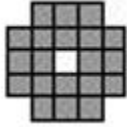(b) $\frac{2}{5} + 0.28 \times 3 =$

Answer: _____ (2)
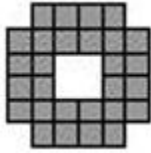
(c) $5\frac{2}{3} \div \frac{34}{9} - \frac{1}{2} =$

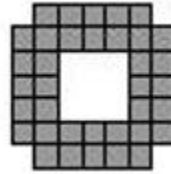Answer: _____ (3)

**(Total 9 Marks)**

2. The first three shapes in a pattern are given below. There is an empty square in the centre of each shape.

| Shape 1 | Shape 2 | Shape 3 |
|---|---|---|

(a) How many small shaded squares are needed to make the fourth shape in the pattern?

Answer: _____ (2)

(b) The length of the edge of each of the small shaded squares is 1 mm.

Find the area of the empty square in the centre of the fifth shape in the pattern.

Answer: _____ (2)

**(Total 4 marks)**

3. (a) The price of train tickets increased by 4%. Before this increase, the price of a ticket from London to Liverpool was £150.

Find the price of this ticket after the increase.

Answer: _____ (3)

(b) For the completion of a public work, 80 workers had to work for 15 days.

How many days could have been saved if for the same work 120 workers of the same efficiency were involved?

Answer: _____ (3)

**(Total 6 Marks)**

4. Harry owes €23 000. His salary is €1680 per month. He spends €1200 of this money and gives the rest of it towards his debt at the end of each month.

How much will he still owe after $2\frac{1}{3}$ years?

Answer: _____ (5)

**(Total 5 Marks)**

5. Three bells ring together at 10:00 a.m. The first bell rings every 12 minutes, the second bell every 18 minutes and the third bell every one hour.

How many times will all three bells ring together again by 5:00 p.m.?

Answer: _____ (5)

**(Total 5 Marks)**

6. Christina shared €7200 among her three children. Maria got $\frac{1}{3}$ of the money while George and Peter shared the remaining money in the ratio of their ages. George is 3 years old and Peter is 5 years old.
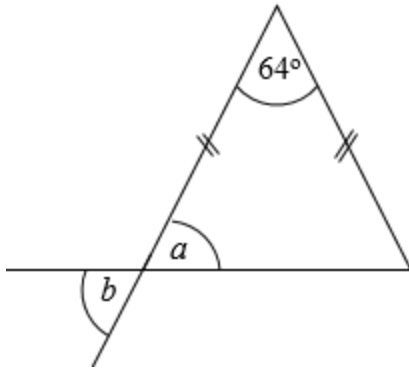
Find the amount of money that each child got.

Answer:    Maria _____ , George _____, Peter _____ (5)
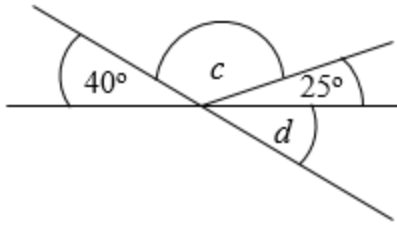
**(Total 5 Marks)**

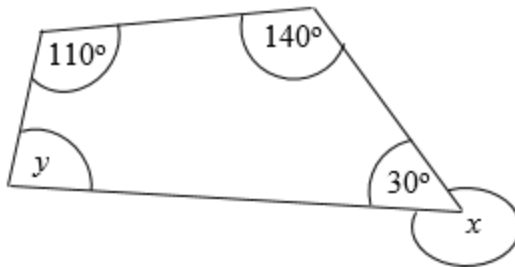7. Find the angles marked with letters.

(a)



Answer: $a =$ _____ , $b =$_____ (2)

(b)



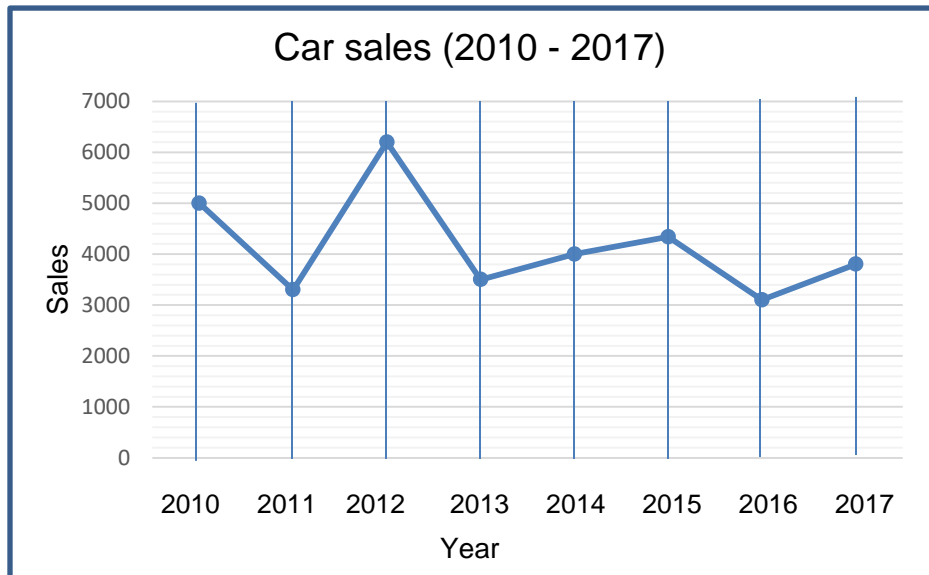Answer: $c =$ _____ , $d =$_____ (2)

(c)



Answer: $x =$ _____ , $y =$_____ (2)

**(Total 6 Marks)**

8. The following diagram presents the car sales made by a company during the period of time from 2010 to 2017.

**Car sales (2010 - 2017)**



(a) In which year was the smallest number of car sales noticed?

Answer: _____ (1)

(b) In which period of time was the greatest decrease in the car sales noticed?

Answer: _____ (1)

**(Total 2 Marks)**

9. Stavroulla put $\frac{1}{7}$ of her pencils in a box. If she puts 10 more pencils in the box then she will have half of her pencils in the box.

How many are all the pencils?

Answer: _____ (3)

**(Total 3 Marks)**

10. (a) A group of three boys have 14 cherries each. Before they start eating them, four extra boys join the group and they all share the cherries equally amongst them.

How many cherries will each boy eat?

Answer: _____ (2)

(b) When Eleni went to America on holiday she changed €2500 to dollars. The exchange rate was €1= \$1.14.

How many dollars did Eleni take with her?

Answer: _____ (2)

**(Total 4 Marks)**

11. A room that is 6.4 m long and 4 m wide is going to be covered by square tiles of length 40 cm.

How many tiles are needed in order to completely cover the room?

Answer: _____ (4)

**(Total 4 Marks)**

12. There are 10 balls in a box. Each ball has a number from 1 to 10 written on it and each number appears only once. Of these balls, 5 are red, 4 are blue and 1 is green.

(a) Melina will take at random a ball from the box, note the number and put it back in the box.

Find the probability that the number written on the ball

(i) is bigger than 6,

Answer: _____ (1)

(ii) is a multiple of 3,

Answer: _____ (1)

(iii) is odd.

Answer: _____ (1)

(b) Andreas will remove a blue ball from the box. Then he will take at random a second ball.

What is the probability that the second ball will be blue?

Answer: _____ (2)

**(Total 5 Marks)**

13. A lorry travels at 90 kilometres per hour.

How long will it take to cover 120 kilometres?
Give your answer in hours and minutes.

Answer: _____ (3)

**(Total 3 Marks)**

14. The mean of the numbers printed on the cards below is 5.

Which is the number printed on the card that is turned upside down?

| 6 | 7 | | 2 | 5 | 8 |

Answer: _____ (3)

**(Total 3 Marks)**

15. A print shop offers the following costs for printing advertising leaflets.

**Pieces**                      **Cost of printing**

5000                          €105
for every extra thousand     €20

Minimum charge for postage: €15 for up to 5000 pieces
+ €2 for every extra thousand

Work out the total cost for the print out and postage of 8000 pieces.

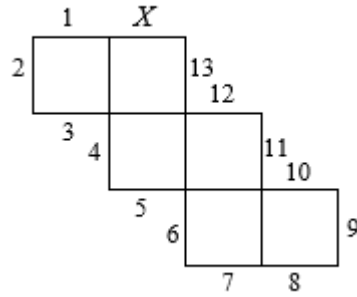Answer: _____ (5)

**(Total 5 Marks)**

16. A greengrocer bought 60 kg of mandarins at 90 cents per kilogram but $\frac{1}{5}$ of them were rotten so he threw them away. He put the remaining mandarins in bags that held 2 kg each and sold them. He made €18 profit out of this sale.

How much did he sell each bag for?

Answer: _____ (6)

**(Total 6 Marks)**

17. The diagram below gives the net of a cube of side 7 cm.



(a) Which numbered side will join with side $X$ when we fold the net in order to form a cube?

Answer: _____ (1)
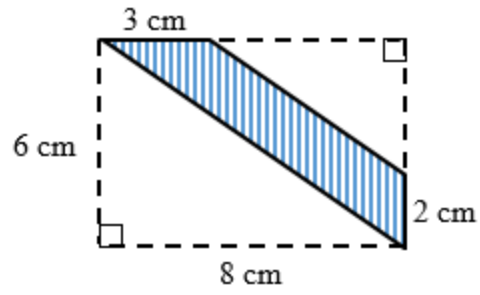
(b) Find the volume of the cube which is formed.

Answer: _____ (2)

(c) Find the total surface area of the cube which is formed.

Answer: _____ (2)

**(Total 5 Marks)**

18.

3 cm

6 cm

8 cm

2 cm

Find the area of the shaded region of the above shape.

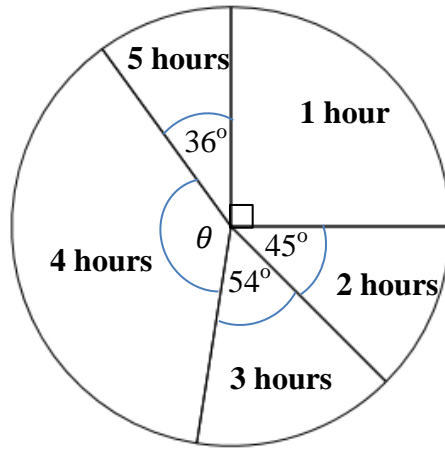Answer:_____ (5)

**(Total 5 Marks)**

19. Emily has a confectionery and she will prepare 50 jars of strawberry jam and 40 jars of apricot jam. In each jar she will put 150 g of jam. Strawberry jam costs €12 per kilogram while apricot jam costs €10 per kilogram. The cost for each empty jar is 60 cents. Emily wants to make 60% of the total cost of production as profit.

Find how much profit she will make when all the jars are sold.

Answer: _____ (8)

**(Total 8 Marks)**

20. We asked a sample of 80 high school students about the number of hours they spend watching TV every day. The results of the survey are given on the pie chart.



For this sample, find:
(a) the number of students that watch TV for 5 hours every day,

Answer: _____ (2)

(b) the percentage of the students who watch TV for 3 hours every day,

Answer: _____ (3)

(c) the size of the angle marked $\theta$.

Answer: _____ (2)

**(Total 7 Marks)**

END