THE G C SCHOOL OF CAREERS

ENTRANCE EXAMINATION

SCHOOL YEAR 2021-2022

MATHEMATICS

(This examination paper consists of 16 pages, including this page).

THE G C SCHOOL OF CAREERS

ENTRANCE EXAMINATION

SCHOOL YEAR 2021-2022

GOOD LUCK

Time: 1 hour and 30 minutes

MATHEMATICS

- This paper consists of **25 questions**.

- Answer **ALL** the questions in the space provided.

- Show **all your workings**.

- The use of a calculator is **not allowed**.

- Write your answers **clearly**.

1. Calculate the following and simplify your answer:

a) $\dfrac{1}{4} + \dfrac{3}{12} + \dfrac{4}{16} + \dfrac{5}{20} \times 5 =$ **(3)**
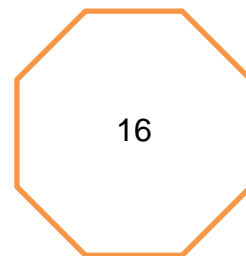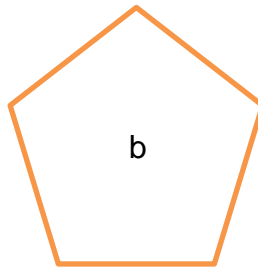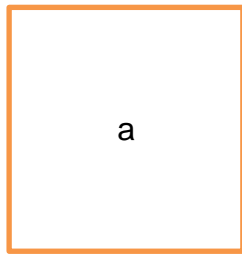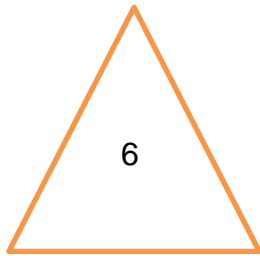
Answer: _____

b) $\left(5\dfrac{1}{9} + \dfrac{5}{12} \div \dfrac{3}{4} \right) \times 0.6 + 0.6 =$

(4)

Answer: _____

c) $\dfrac{5 + 5 \times \dfrac{1}{5} - 3^2 + 1^5 \times 8}{\left(\dfrac{1}{2} \right)^3} =$ **(4)**

Answer: _____

2. Find the value of a and b.

(2)

Answer: a = _____ , b = _____

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3. A container full of milk weighs 25 kg. The same container half-filled with milk weighs 13 kg. Find how much the empty container weighs.

(3)

Answer: _____

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4. The teacher wrote on the board the smallest integer whose sum of digits is equal to 20. Find the tens digit of this number.
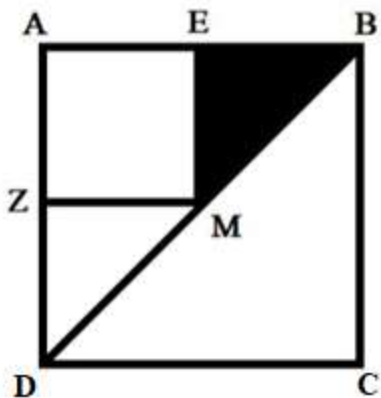
(2)

Answer: _____

5. On a table there are triangles and quadrilaterals made of cardboard which have no contact with each other. We count a total of 27 peaks. If you know that there is more than one triangle, find how many triangles and how many quadrilaterals are on the table.

(3)

Answer: triangles _____, quadrilaterals _____

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6. ABCD is a square. The points E and Z are the midpoints of the sides AB and AD respectively. M is the midpoint of the diagonal BD. Find what percentage of the area of the square is the area of the triangle EMB.

(3)

Answer: _____

7. John needs 16 minutes to read from the beginning of page 8 to the end of page 15 of a book. If he started on page 32 of the book at 5:07 p.m., find which page he will be reading at 5:55 p.m.

(4)

Answer: _____

_____

8. George wants to buy basketballs. If he buys five basketballs, he will have €20 left in his wallet. If he buys seven basketballs, he will have to give €16 more than the money he has. How much does each basketball cost?

(3)

Answer: _____

_____

9. An aquarium is full of water up to $\dfrac{11}{14}$ of its capacity. I want to decorate it, so I remove 126 litres of water. When I remove the water, the aquarium will be half full. Find how many litres of water the aquarium can hold when full.
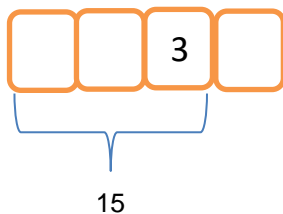
(4)

Answer: _____

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10. A four-digit number has the number 3 in the place of tens. The sum of the first three digits is 15.

Find the missing digits of the number if you know that:

- the number is divisible by 3 but not 4.
- if you write the digits in the reverse order, the new number is divisible by 5.

(3)


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[   ][   ][ 3 ][   ]
 _____|_____/
         15
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11. On the line below, the length of AB is the $\frac{1}{4}$ of the length of AC. Find which number corresponds to the letter B and what the distance BC is.

(4)

(Diagram not accurately drawn)

Answer: B = _____ , BC = _____

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12. George's mother bought 30 kilos of honey and 20 kilos of sugar from a food store. He paid a total of €108. If 3 kg of honey cost as much as 10 kg of sugar, how much does 1 kg of honey cost?

(4)

Answer: _____

13. At a theater, the regular ticket costs €4 more than the children's ticket. We know that 4 regular tickets and 2 children's tickets cost €64. Find how much a regular ticket costs and how much a children's ticket costs.

(4)

Answer: Regular ticket _____,

Children's ticket_____

14. Nick buys tea at €5 per kilo (Kg) and sells it €1.25 per 200 grams (g). Find his percentage profit.
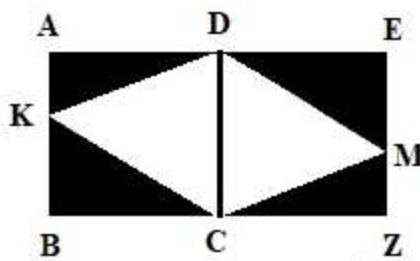
(4)

Answer: _____

15. The numbers α and β verify the following equations.

Find the numbers α and β.

(4)

- $\dfrac{36}{\alpha} + 7 = 10$

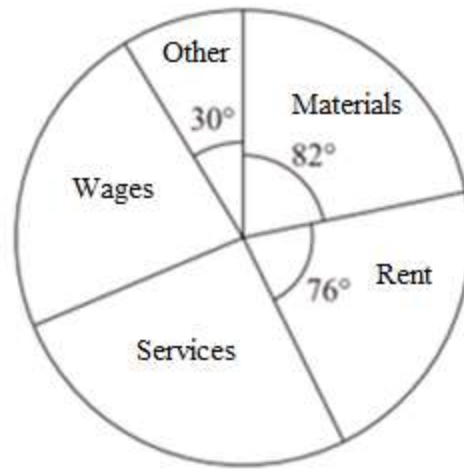- $\alpha - \dfrac{\beta}{2} = 15 - \alpha$

Answer: $\alpha = $ _____, $\beta = $ _____

16. In the figure below ABCD and CDEZ are identical squares. D and C are the midpoints of sides AE and BZ respectively. K and M are random points on the sides AB and EZ. If the perimeter of the rectangle ABZE is 48cm, find the area of the shaded region. **(4)**

Answer: _____

17. The pie chart below gives information about the expenditure of a gas company in one year.

(Diagram not accurately drawn)

The amount spent on materials is 369 million euros. The amount spent on services is the same as the amount spent on wages.

Find the amount spent on services.

(4)

Answer: _____million

18. In a class there is an equal number of boys and girls. Nine girls leave the classroom to take part in a show. Now the number of boys in the class is twice the number of girls. Find how many boys and girls in total had been in the class, before the 9 girls left.

(3)

Answer: _____

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19. Inside a box I have several cards

(5)

3 black, 11 white, 9 blue and 7 red

Complete the following.
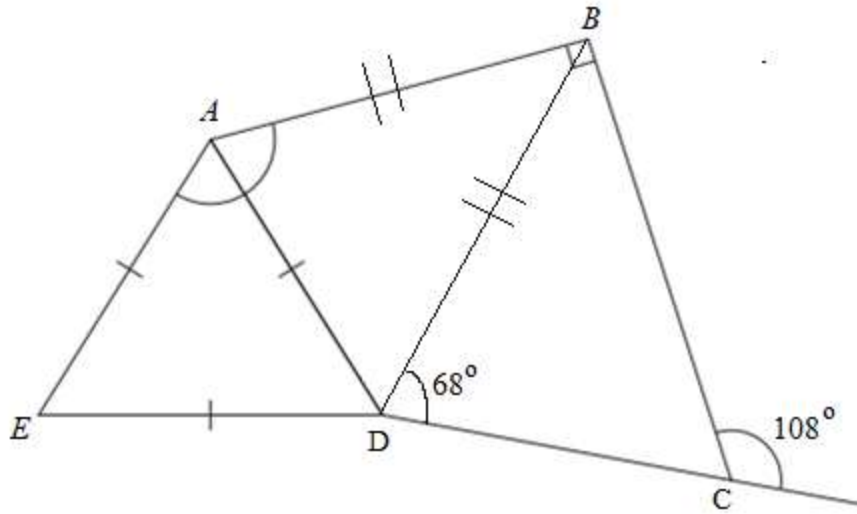
If I pick a card at random from the box:

- The probability of its colour being _____ is $\frac{3}{10}$.
- The probability that it is not blue in percentage is _____.

If I add more black cards into the box and pick a card at random, the probability of it being black is $\frac{1}{4}$.

- How many black cards did I add in the box? _____

20. In the figure below AED is an equilateral triangle, $AB = BD$ and angle B is a right angle. Work out the size of angle EAB.

(5)

(Diagram not accurately drawn)

Answer: $EAB = $ _____

21. There are 150 balls in a box. 60% of the balls are black and the rest are white. We remove 15% of the white balls from the box and add 29 black balls. Find the ratio of white balls to the total number of balls in the box.

(5)

Answer: _____

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22. A rabbit and the cage it is in, weigh 4.2kg. A goose and its cage (identical to the rabbit's cage) weigh 5.2kg. The goose and the rabbit together weigh 3.4kg. Find the weight of the cage.

(3)

Answer: _____

23. The average of twelve numbers is 25. If we delete two numbers, the average of the remaining numbers is 19. Find the numbers we deleted if one number is three times the other one.

(4)

Answer: _____

24. In a piggy bank there are 18 €1 and €2 coins with a total weight of 143 grams. There is no other money in the piggy bank. Each €1 coin weighs 7.5 grams and each €2 coin weighs 8.5 grams. Find the total amount of money in the piggy bank.

(4)

Answer: _____

25. There are 120 rooms in a hotel. 60% of the rooms have air conditioning and the rest do not. Today 75% of the hotel rooms are occupied. $\frac{2}{3}$ of the occupied rooms have air conditioning. What percentage of rooms <u>without</u> air conditioning are <u>available</u>.

(5)

Answer: _____

END