THE G C SCHOOL OF CAREERS

ENTRANCE EXAMINATION

SCHOOL YEAR 2010-2011

MATHEMATICS   Time: 1 hour and 30 minutes

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

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

- You must **show all your working**.

- Your answers must be clearly and neatly presented.

- The use of calculator is not permitted.
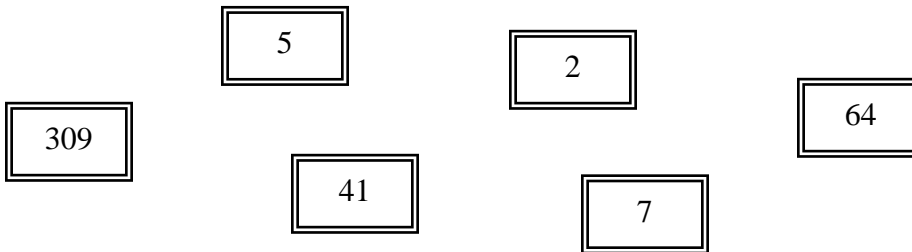
1. Work out the following:

$$A = \frac{1}{3} + \left(\frac{2}{3} + \frac{1}{4}\right) + \left(\frac{3}{4} + \frac{1}{5}\right) + \left(\frac{4}{5} + \frac{1}{6}\right) + \left(\frac{5}{6} + \frac{1}{7}\right) + \left(\frac{6}{7} + \frac{1}{8}\right)$$

(2 marks)

Answer: _____

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2. What is the largest number you can generate if you place the cards below one next to the other?

(3 marks)

| 5 |

| 2 |

| 64 |

| 309 |

| 41 |

| 7 |

Answer: _____

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3. A raincoat was sold at a loss of €18. Find the price of the raincoat if it was sold at a 20% loss.

(3 marks)

Answer: _____

_____

4. Miss Sofia needs to buy a carpet of 5 metres length and 4 metres width. In a shop, each square metre of carpet costs €9.9. How much money will Miss Sofia pay, if they make her a 20% discount?

(4 marks)

Answer: _____

_____

5. In a sack of balls, there are 10 red, 11 green, 14 blue, 13 white and 12 black balls.

   a) If you pick a ball at random, what is the probability of not picking a green ball?

   (2 marks)

   Answer: _____

   b) If you pick at random a white ball and do not replace it, what is the probability that the second ball is white?

   (2 marks)

   Answer: _____

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6. Simplify the fraction:

   (3 marks)

   $$5 \times \frac{3}{1 - \dfrac{2}{3+2}} =$$

   Answer: _____

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7. Nicholas loves sending messages from his mobile phone. He sends 3 messages a day and every sent message costs €0.25. For every 10 messages Nicholas sends, he can send one for free. Find how much money he will pay in two weeks.

(3 marks)

Answer: _____

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8. In the addition below, each letter represents a digit. Different letters represent different digits. Find the digits represented by letters A and B.

(4 marks)

```
    A A A
  + A A B
    A C 7
  ─────────
  2 0 1 8
```

Answer: A = _____

B = _____

9. The average age of a grandfather, a grandmother and their 7 grandchildren is 28 years. The grandchildren's average age is 15, while the grandfather is 3 years older than the grandmother. How old is the grandfather?

(5 marks)

Answer: _____

_____

10. A number is divisible by 3 and 9. This number is a multiple of 2 and 5, but not of 4. Find this number, given that it is between 100 and 300.

(3 marks)

Answer: _____

_____

100 kilos of flour produce 225 kilos of bread. How many kilos of flour will be needed to produce bread for one month for 352 soldiers if each soldier eats $\frac{3}{4}$ of a kilo of bread a day?

(1 month = 30 days)

(5 marks)

Answer: _____

12. The lowest common multiple of two numbers is 105 and their highest common factor is 5. Find the sum of the two numbers, given that their sum is smaller than 100.

(4 marks)

Answer: _____

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13. Father's age is 5 years smaller than twice his daughter age. If the sum of their ages is 55 years find their ages.

(4 marks)

Answer: Father _____

Daughter _____

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14. Natassa's dad earns €8.80 per hour of work, when he works up to 40 hours a week. When he works more than 40 hours a week, every extra hour is paid at the ratio $1:1\dfrac{1}{2}$. How much will he earn in a week if he works 52 hours?
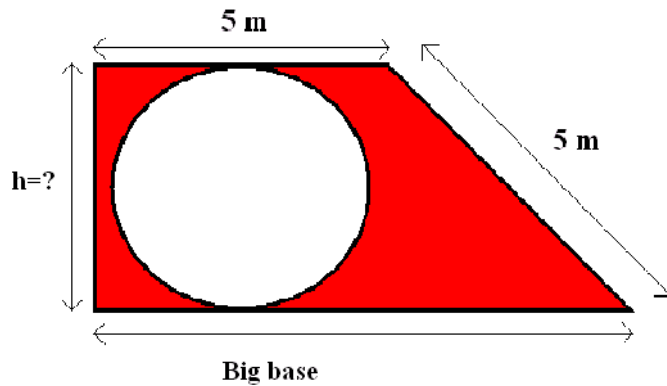
(4 marks)

Answer: _____

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15. In a box, there are 18 more black cards than 3 times the number of the white cards. If there are 45 black cards, how many cards are there in the box?

(3 marks)

Answer: _____

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16. The following shape is a right angle trapezium with a perimeter of 22 m. Within the trapezium there is a circle. If the height of the trapezium is half its big base, find:

(Diagram not to scale)

a) the height of the trapezium.

(3 marks)

Answer: _____

b) the area of the shaded region. Use $\pi = \dfrac{22}{7}$ and give your answer in the form of a fraction.

(3 marks)
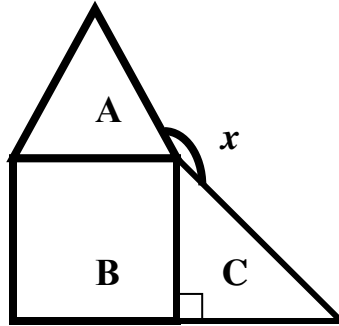
Answer: _____

17. In the following shape: A is an equilateral triangle
                                        B is a square
                                        C is an isosceles right angled triangle.

Find angle x.

(4 marks)

Answer: Angle x =_____

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18. Calculate the following:

a) $2 \times 15\% + 2\frac{1}{6} =$
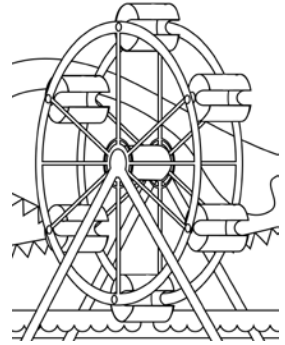
(2 marks)

Answer: _____

b) $(2^{25} \div 2^{22})^2 \div 2^3 + \left(\frac{1}{3}\right)^0 =$

(3 marks)

Answer: _____

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19. At a fun fair there is a Ferris wheel of radius 14 metres. The wheel moves at a speed of 352 metres per hour.

Use $\pi = \dfrac{22}{7}$.

a) Find the time needed for the wheel to make a full rotation.

(4 marks)

Answer: _____

Kyriacos was on the wheel from 9:00 a.m. until 9:45 a.m.

b) How many times did he rotate?

(2 marks)

Answer: _____

20.

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Symbols

+ - × ÷ ( )

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Using **only** the symbols above, complete the following equations:

(5 marks)

a) 3   2   4   =   18

b) 3   2   4   = $\dfrac{5}{2}$

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21. A total of 60 birds perch on three trees. Suddenly, 6 birds fly off the first tree, 8 fly off the second and 4 fly off the third. Now, the number of birds perching on each tree is the same. How many birds perched on the second three originally?

(3 marks)

Answer: _____

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22. The chart below shows the speed at which a car travelled. Study the data given and answer the questions.
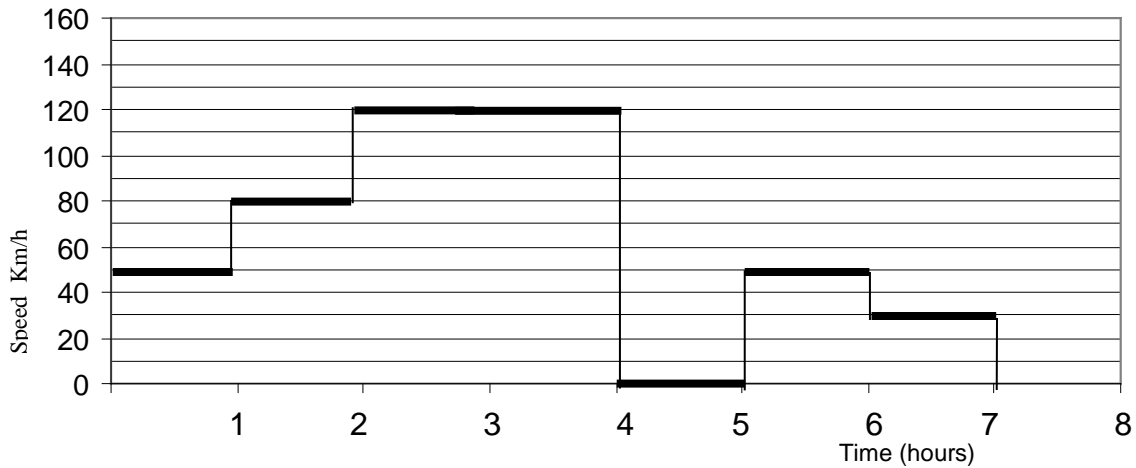
If the car started its journey at 8:00 a.m., find:

a) The time period during which it travelled at 120km/h.

(1 mark)

Answer: _____

b) The time at which the car stopped.

(1 mark)

Answer: _____

c) For how long the car was not moving.

(1 mark)

Answer: _____

d) Its speed at 2:30 p.m.

(1 mark)

Answer: _____

e) The distance covered between 13:00 and 15:00.
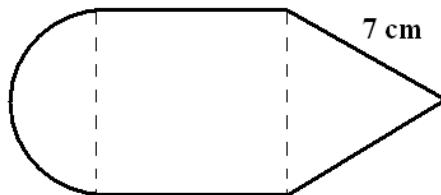
(2 marks)

Answer: _____

23. At every stop, $\dfrac{1}{3}$ of the passengers of a bus get off the bus but nobody gets on it. At the third stop, 4 passengers get off the bus. Find how many passengers were on the bus originally?

(3 marks)

Answer: _____

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24. The following shape is made of one equilateral triangle, a square and a semicircle. Find the perimeter of the shape. Use π = 3.14.

(4 marks)

7 cm

Answer: _____

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25. A rectangular container with dimensions 2m x 1.5m x 0.1m, is completely filled with water. A cube with edge 4cm was inserted into the container. Find:

a) the volume of the container, in cm^3.

(2 marks)

Answer: _____

b) how many L of water will overflow out of the container?

(2 marks)

Answer: _____

END