ONLINE MATHEMATICS ENTRANCE EXAMINATION

DATE: JULY 28, 2020

TIME: 16.00-17.30

1. You have 1 hour and 30 minutes for the exam.

2. You must answer all questions.

3. No calculators are allowed.

4. Type your answers in the spaces below the questions.

5. Answers with no evidence of calculations will not score any marks. Workings and answers written on any other page will not be considered.

6. You will need a computer connected to high speed Internet and stable electricity (You cannot take online math entrance exam on mobile phone).

Please note additional requirements:

7. Applicant will be automatically disqualified from the examination and will receive a score of 0 for the exam and exam administration fee payment will not be reimbursed:
   a) If he/she leaves the room during the examination.
   b) If he/she talks, whispers, or turns around.
   c) If he/she found to have any unauthorized materials during the examination
   d) If he/she caught cheating in the examination.
   e) If he /she fails to show contents of his/her pockets or any other containers to the invigilators.
   f) If he/she is found to have a mobile phone or other electronic device (switched on or off) on his/her room/table during the exam.

8. During the examination period, any technical problems including poor internet connection from applicant's side that may cause an applicant to leave the examination environment is under the applicant's responsibility.
9. Applicant *cannot* re-join the exam and continue the examination process. Once you leave the examination or you disconnect, you cannot continue the exam.
10. Invigilator may conduct room security checks at any point during your exam. You must perform all requested security checks. Loss of time during these security checks cannot be made up.
11. Please follow detailed exam instruction sent to applicant's personal account via admission system.
12. Applicant has to follow the instruction strictly during the examination.

Applicant ID: _____

All questions on this paper must be answered.

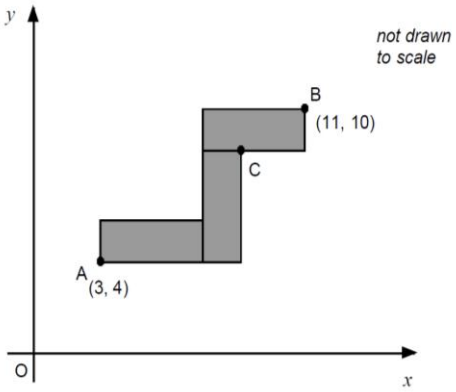
Write the answers in the space below each question.

Working must be shown for all stages of the questions.

1. Find the dimensions of a rectangle whose perimeter is 54cm and area is 170cm^2

(3 marks)

2.



The diagram shows three identical rectangles that have their sides parallel to the axes.

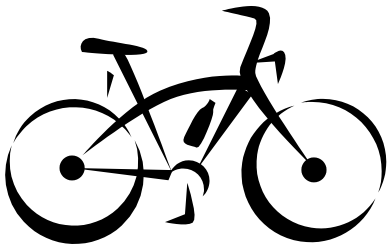
a) What are the dimensions of each rectangle?

(3 marks)

b) Find the co-ordinates of point C.

(3 marks)

3. The diameter of a bicycle wheel is 67 cm.



a) Work out the circumference of the wheel.

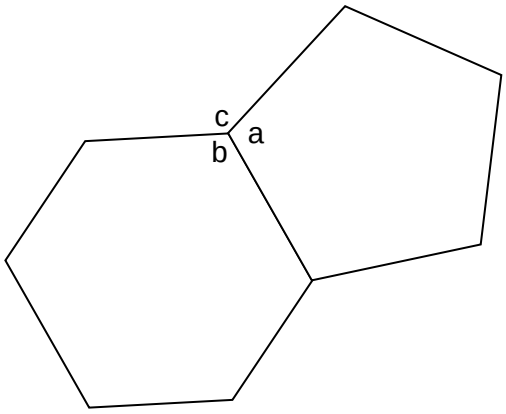
(2 marks)

b) Work out the distance, in meters, the bicycle travels when the wheel makes 300 complete turns. Give your answer in meters.

(3 marks)

4. The diagram shows a regular pentagon and a regular hexagon.

Find the angles marked a, b and c.



(6 marks)

5. You are planning a short holiday to Bratislava with your friends, Ana and Martins. You will not be taking a bag but Ana will be taking two and Martins will be taking one. You have two travel companies to choose from – Low Cost Holidays and Sunny Days Airlines. You find the following information out about each company's prices.

Low Cost Holidays Winter Getaways	**Sunny Days Airlines Super Deals Tashkent - Bratislava**
November and December Tashkent – Bratislava fares Just $29 per person return (Excludes charges listed below) Further charges apply to all bookings: Taxes per person (return flights) $23.20 Baggage one way per item $14 Booking fee per passenger $3	Out 9th November return 13th November $59.90 per person return (excluding taxes and fees). Taxes (flights departing Tashkent) $10 Taxes (flights departing Bratislava) $5 Baggage (up to 2 items per person) FREE Booking fee per group (up to 5 passengers) $7.50

Work out the cost of each holiday option. The friends want to choose the company with the lower cost. Which company should they use?

(7 marks)

6. Solve these equations

a) $\frac{x+1}{2} - \frac{4x-1}{3} = \frac{5}{12}$

(3 marks)

b) $\frac{3y+6}{10} + \frac{5-2y}{5} = 6$

(3 marks)

7. Here are the first 5 terms of an arithmetic sequence

8 11 14 17 20

a) Find an expression, in terms of *n,* for the *n*th term of this sequence

(2 marks)

b) Amina says the number 100 is a term of this sequence.

Amina is wrong. Explain why.

(2 marks)

c) The n^{th} term of another sequence is $2n^2 - 16n$.

Work out the 8^{th} term of this sequence

(2 marks)

8.

The weight of $5m^3$ of copper is 44 800kg.

a) Work out the density of copper in kg/m^3

(2 marks)

The density of zinc is 7130 kg/m^3.

b) Work out the weight of $5m^3$ of zinc.

Round your answer to the nearest 10 000.

(3 marks)

9.

a) Expand and simplify

$$3(2x - 1) - 2(2x - 3)$$

(2 marks)

b) Expand and simplify

$$8(n + 1)^2 - 2(n - 3)^2$$

(3 marks)

10. A college has 1200 students. 575 of them are girls.

$\frac{2}{5}$ of the girls like sport. 60% of the boys like sport.

Work out the total number of students at the college who like sport.

(3 marks)

11. a) *y* is inversely proportional to *x*. *y* = 8 when *x* = 2. Find *y* when *x* = 4.

(2 marks)

b) When a fixed volume of water is poured into a cylindrical jar, the depth, *D* cm, of the water is inversely proportional to the cross-sectional area, *A* cm^2 of the cylindrical jar.

When $A = 40$, $D = 120$.

(i) Find *A* when *D* = 150

(2 marks)

(ii) Find *D* when *A* = 60

(2 marks)

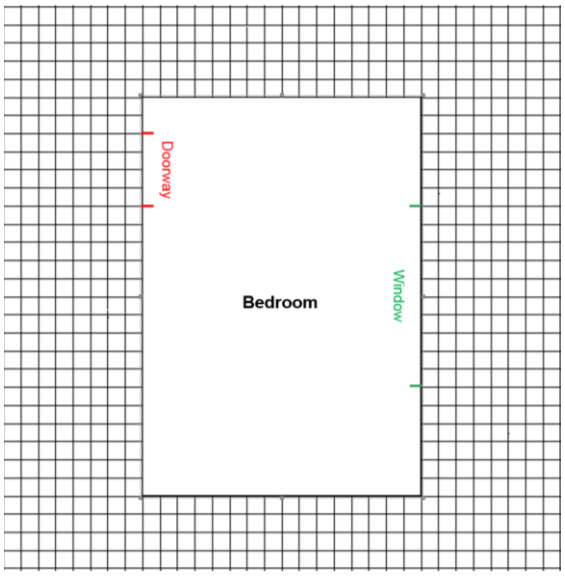
12. Solve the equation

$$\frac{2^{2x-1} \times 4^{x+1}}{8^{x-1}} = 64$$

(4 marks)

13. Madison has decided to wallpaper her bedroom. She draws a plan of her room.

Scale: Each square = 25cm.



The bedroom walls are 2.5m high and the rolls of wallpaper she chooses are each 10m long and 50 cm wide. There is a door with dimensions height 2m × width 1m and a window with dimensions height 1m and width 2.5 m.

Using the scale on the plan and the dimensions of the door and window calculate how many complete rolls of wallpaper she will need to buy.

Remember to show all your working out. (8 marks)

END OF TEST