WESTMINSTER INTERNATIONAL UNIVERSITY IN TASHKENT
An Accredited Institution of the University of Westminster (UK)

UNIVERSITY OF WESTMINSTER

ONLINE MATHEMATICS ENTRANCE EXAMINATION

DATE: JULY 21, 2020

TIME: 11.00-12.30

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. Adham wants to average 10 000 steps per day this month.
   It is June 28th. Adham has averaged 9960 per day so far.
   He has two more days left.
   How many steps must he walk over the next two days to achieve his goal?

(4 marks)

2. The radius of the London Eye is 60 m.
   How far will a person travel if the wheel turns 4 times?
   Use 3.14 as your value for π.
   Give your answer to the nearest whole metre.

(4 marks)

3. The seats in a theatre are priced so that the seats nearest to the stage are the most expensive and the price decreases each row back from the stage.
   In row A (nearest to the stage) the seats are $50 each. In row B the seats are $47.50.
   In row C the seats are $45 etc.

   a) What is the formula for the *n*th term in this arithmetic sequence?

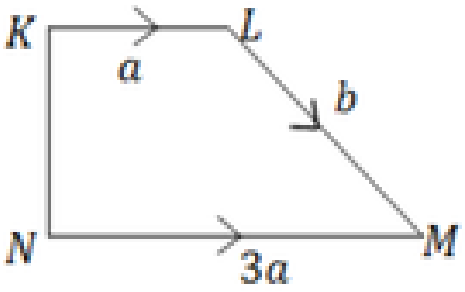
(3 marks)

   b) What is the price of a seat in the 12th row from the stage?

(2 marks)

4.

Write each vector in terms of a and/or b.



a. $\overrightarrow{MK}$

b. $\overrightarrow{NL}$

c. $\overrightarrow{NK}$

d. $\overrightarrow{KN}$

(4 marks)

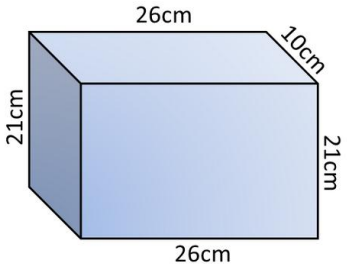
5. A farmer has some goats and some chickens.

Altogether they have 72 heads and 212 feet.

How many goats and chickens are there?

(4 marks)

6. Calculate the surface area of the shape below. State the units in your answer.



(3 marks)

7.

a) The length of a pen is rounded to the nearest 10 millimetres.

The length is give as 140 mm.

What are the upper and lower bounds of the length of the pen?

(2 marks)

b) The decimal $0.\dot{8}\dot{1}$ has a period of length two.

Using algebra, convert it to a fraction in its simplest form.

(2 marks)

8. Yorkshire tea bags can be bought in 160 bag boxes and 240 bag boxes.

Option 1	Option 2
Yorkshire Tea	Yorkshire Tea
160 bags for £3.40	240 bags for £4.50

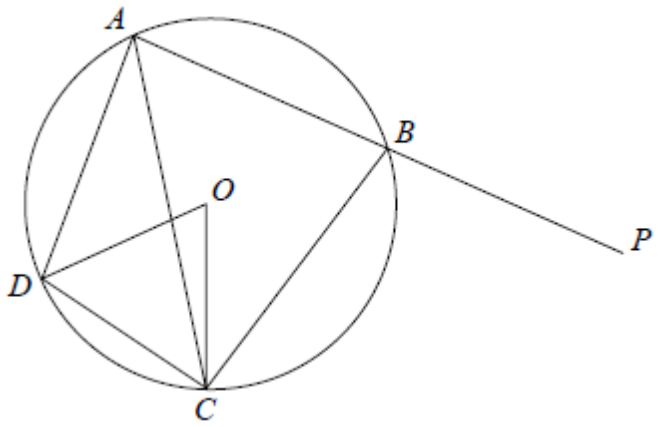
a) What is the price per tea bag for option 1?

(2 marks)

b) How much cheaper, per tea bag, is option 2?

(2 marks)

9.



A, *B*, *C* and *D* are four points on a circle, centre *O*. *PBA* is a straight line.

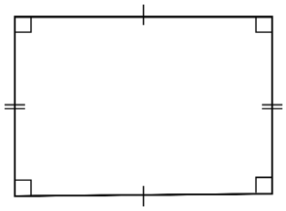
Angle *PBC* = 100°. Angle *DAC* = 23°. Show that the size of angle *OCA* = 10°.

You must give a reason for each stage of your working.

(6 marks)

10.

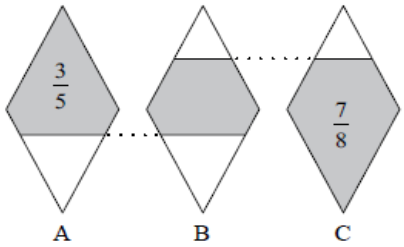
a) Find the dimensions (length and width) of a rectangle whose perimeter is 25 cm and area is 38.5.



(3 marks)

b) The diagram shows three identical shapes A, B and C. Where $\frac{3}{5}$ of shape A is shaded.

While $\frac{7}{8}$ of shape C is shaded. What fraction of shape B is shaded?



(2 marks)

11. The value of a Ferrari sports car is $220 000.

Each year the value decreases by 12% of the value at the beginning of that year.

Work out the value of the car after four years have passed.

Give your answer to the nearest thousand dollars.

(3 marks)

12.

a) Simplify

$$\frac{5abc}{4abd} \times \frac{6abd}{7bcd}$$

(2 marks)

b) Simplify

$$\frac{3m^2n}{5p^2q} \times \frac{6pq}{2n^2} \div \frac{6m}{6p^2q}$$

(2 marks)

c) Calculate

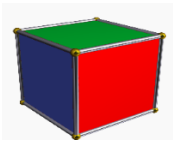
$$\frac{(3^{15} + 3^{13}) \times 2^9}{(3^{14} + 3^{12}) \times 1024}$$

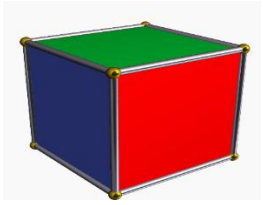
(2 marks)

13. A builder needs to lift a concrete block. It is a cuboid with dimensions 2 m by 0.2 m by 0.2 m. Concrete has a density of 7.6 g/cm^3. The builder's crane can lift a maximum load of 500 kg. Can the crane be used to lift the concrete block? You must give reasons for your answer.

(4 marks)

14. A box has a surface area of 864cm^2. A second box is 2.5 times as wide, 2.5 times as long and 2.5 times as tall. What is the surface area of the second box?





(4 marks)

15. a) Expand the brackets

$$(x+4)(3x+1)(x-7)$$

(2 marks)

b) Factorise

$$35w^2+47w-60$$

(2 marks)

c) Make *b* the subject of the formula

$$a=\frac{5(6b+4c)}{b}$$

(2 marks)

16. The air temperature, ***T***^{o}C, outside a spacecraft flying at a height of ***h*** meters is given by the formula

$$T=26-\frac{h}{500}$$

A spacecraft is flying at a height of 27 000 meters.

a) What is the temperature outside the space craft?

(2 marks)

b) If the outside temperature is -52^{o}C, what height is the space craft flying at?

(2 marks)

End of test.