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

UNIVERSITY OF WESTMINSTER

# ONLINE MATHEMATICS ENTRANCE EXAMINATION

## DATE: JUNE 30, 2020

**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:** _____

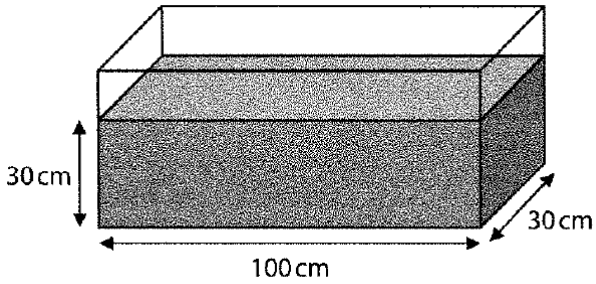
All questions on this paper must be answered.

Write the answers in the space below each question.

Working must be shown for all stages of the questions.

1.

Anya has a new fish tank. The fish tank is filled with water up to a depth of 30 cm.




| |
|---|
| 1000 $cm^3$ = 1 litre<br>1 UK gallon = 4.5 litres |

Anya can keep 3 small fish in each UK gallon of water.

How many fish can Anya keep in the water?

**(4 marks)**

2

a)

A scale model of a mini car is to be made.

It is *similar* in all aspects to the real car.

Below is a table of specifications for the real and the model cars.

Find the values of *a, b* and *c*.

| | **Car** | **Model** |
|---|---|---|
| **Length** | 420 cm | 12 cm |
| **Width** | *a* cm | 5 cm |
| **Area of windscreen** | 8330 $cm^2$ | *b* $cm^2$ |
| **Size of boot** | *c* $cm^3$ | 19.2 $cm^3$ |

**(5 marks)**

b)

When 6 robots are employed to produce a real minicar it takes 4 minutes to make each car.

i) Use inverse proportion to find out how long it would take 8 robots to build a car

**(1 mark)**

ii) How many robots would need to be employed to make a car in 30 seconds?

**(2 marks)**

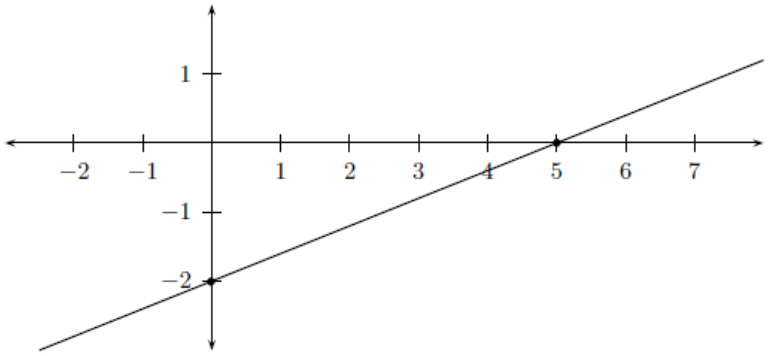
3.

a) Complete the table below for $y = \frac{1}{2}x^2$ for the following values

| ***x*** | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| ***y*** | | | | | | | |

**(3 marks)**

b) Find the equation of the straight line describing this graph.




**(3 marks)**

c) Find the domain of the function

$$y = \frac{5}{3 - x}$$

**(2 marks)**

4.

a) Identify the prime numbers which satisfy the inequality

$0 \leq 2x - 3 \leq x + 8$

**(3 marks)**

b) Make $a$ the subject of

$$\frac{k^2(m-a)}{x} = x$$

**(2 marks)**

5

a) Find the $n^{th}$ term of this sequence

1, 4, 7, 10, 13

**(2 marks)**

b) The sequence $-4n + 26$ only shares one value with the series given in section a).

What is that value?

**(2 marks)**

6.

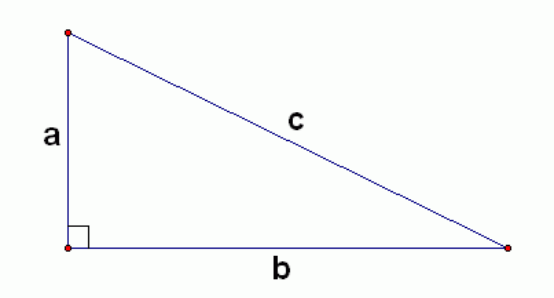
A cube has a total surface area of 726 $cm^2$. What is the length of each edge of the cube?

**(2 marks)**

7.

If $c$ = 4.5 cm and $b$ = 2.5 cm, find the value of $a$.

By trial and improvement give your answer to the nearest 1 decimal point




**(4 marks)**

8.

Here is a prism in the shape of a piece of wood.

Calculate the surface area of this shape. Use 3.14 as the value of $\pi$.

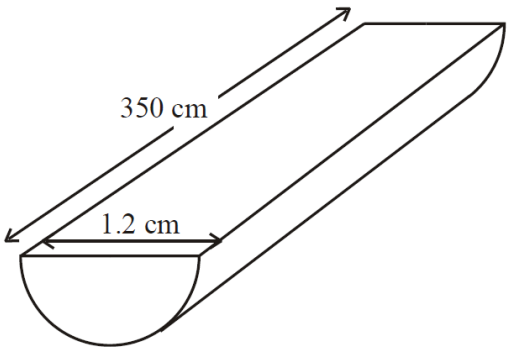



Diagram **NOT** accurately drawn

Give you answer to 1 d.p.

**(5 marks)**

9.

a) Triangle *ABC* has perimeter 20 cm. *AB* = 7 cm, *BC* = 4 cm.

By calculation, deduce whether triangle *ABC* is a right-angled triangle.

**(4 marks)**

b) Calculate the area of triangle *ABC* from section a).

**(2 marks)**

10.

A shop decreases prices by 10% and then by a further 25%.

Valentina says: “Prices have now decreased by 35%”.

Is Valentina correct? *You must show your working.*


**(3 marks)**

11.

Little Ted and Big Ted are two geometrically similar solid toys.

The total surface area of Little Ted is 450 cm$^2$. The total surface area of Big Ted is 800 cm$^2$.

The volume of shape Little Ted is 1350 cm$^3$. Calculate the volume of Big Ted.

**(3 marks)**

12.

a) Simplify

$$\frac{1}{\sqrt{a}-\sqrt{b}}-\frac{1}{\sqrt{a}+\sqrt{b}}$$

**(2 marks)**

b) Write these numbers in order of size. Start with the smallest number.

$$a = 4.3 \times 10^2 \qquad b = 0.043 \times 10^2 \qquad c = 4300 \times 10^{-4} \qquad d = 43$$

**(2 marks)**

13.

$$\boldsymbol{a}=\begin{pmatrix}-2\\3\end{pmatrix} \text{ and } \boldsymbol{b}=\begin{pmatrix}5\\-1\end{pmatrix}$$

Write down as a column vector

a) $2\boldsymbol{a} + \boldsymbol{b}$

**(2 marks)**

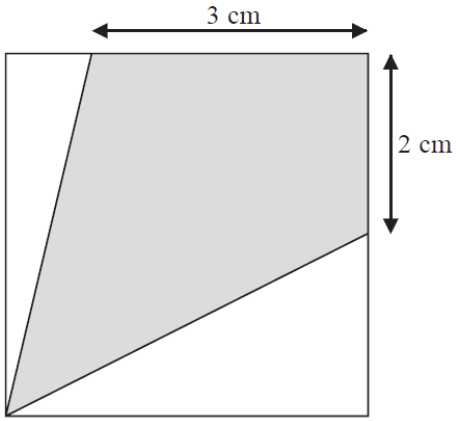
b) $3\boldsymbol{a} - 2\boldsymbol{b}$

**(2 marks)**

14.

The diagram shows a square with perimeter 16 cm.

Work out the proportion of the area inside the square that is shaded.




**(4 marks)**

15.
Calculate the value of *x*

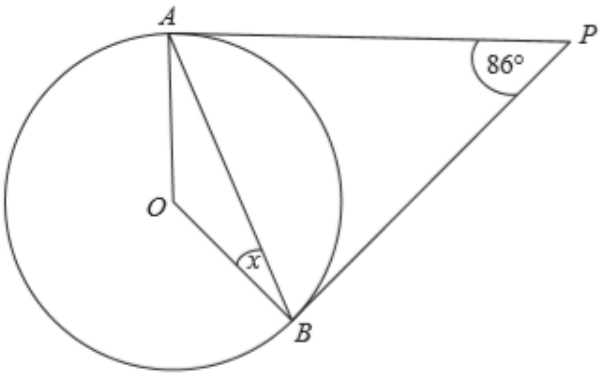



Diagram **NOT** accurately drawn

**(3 marks)**

16.
A straight line passes through the points (0, 5) and (3, 17).

Find the equation of the straight line.

**(3 marks)**

## END OF TEST