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

UNIVERSITY OF WESTMINSTER

Sample of Mathematics Entrance Examination 2022

DATE:
SESSION:

1. You have 1 hour and 10 minutes for the exam.
2. Answer all questions.
3. No calculators are allowed.
4. Write your answers in the spaces below the questions. Answers with no evidence of calculations will not score any marks. Workings and answers written on any other page will not be marked.

Please note additional requirements:

a) You are not allowed to leave during the first 30 minutes or the last 15 minutes of the examination.

b) You are not allowed to talk, to whisper, to turn around or to look at another candidate's examination, all of which are offences and you will be penalized. If you commit this offence you will be given a single written warning; after which if you commit a further offence, you will be reported to an assessment board without a right of appeal or refund of the exam administration fee.

c) You cannot borrow another student's stationery or materials.

d) If your pen runs out of ink, you may request a replacement from the invigilator. No other stationery or materials may be provided for you by the invigilator.

e) If you are found to have any unauthorized exam related materials during the examination this will constitute an offence and you will be disqualified from the exam.

f) If you are caught cheating in the examination, you will be disqualified from the exam.

g) Failure to show contents of your pockets or any other containers to the invigilators will be considered as an offence and you will be disqualified from the exam.

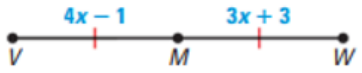
h) All mobile phones and other electronic devices must be switched off and left at a place indicated by the invigilators. If you are found to have a mobile phone or other electronic device (switched on or off) on you during the exam, this will be considered as unauthorized examination materials and you will be disqualified from the exam without a right of appeal.

Applicant ID: _____

All questions on this paper must be answered.

For Multiple choice questions (1-17) select single answer choice.
For Questions 18-20 write the answers in the space below each question.
Working must be shown for all stages of the questions.

1. Point M is the midpoint of $\overline{VW}$. Find the length of $\overline{VM}$.



(2 marks)

A) 12	B) 15	C) 4	D) 10

2. Resolve the following into partial fractions

$$\frac{12}{x^2-9}$$

(2 marks)

A) $\frac{1}{x-3}-\frac{2}{x+3}$	B) $\frac{2}{x-3}-\frac{2}{x+3}$	C) $\frac{2}{x-3}-\frac{2}{x-3}$	D) $\frac{1}{x+3}-\frac{2}{x+3}$

3. Solve the equation

$$\frac{1}{3a-2}+\frac{1}{5a+3}=0$$

(2 marks)

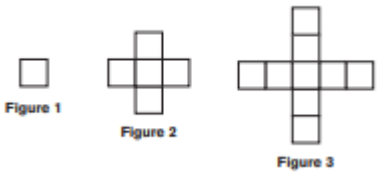
A) $\frac{1}{8}$	B) $\frac{1}{4}$	C) $-\frac{1}{8}$	D) $-\frac{1}{2}$

4. Determine the quadratic equation in x whose roots are 2 and -5.

(2 marks)

A) $x^2-2x+5=0$	B) $x^2+2x-5=0$	C) $x^2-3x+10=0$	D) $x^2+3x-10=0$

5. A sequence of figures is created with squares as shown.
If the pattern continues, how many squares will be in Figure 5.



(2 marks)

A) 17	B) 13	C) 12	D) 15

6.

If the number 412 is added to 3b2 and the result is divisible by 9, tell what the value of b is.

(2 marks)

A) 7	B) 6	C) 5	D) 2

7. Rationalize the denominator.

$$\frac{c}{\sqrt{a}+\sqrt{b}}$$

(2 marks)

A) $\frac{\sqrt{a}-\sqrt{b}}{a+b}$	B) $\frac{\sqrt{a}-\sqrt{b}}{a-b}$	C) $\frac{c(\sqrt{a}-\sqrt{b})}{a+b}$	D) $\frac{c(\sqrt{a}-\sqrt{b})}{a-b}$

8.

Generate a Pythagorean triple which gives us a value of 12 for one of the legs of the triangle.

(2 marks)

A) $6, 6, 12$	B) $8, 10, 12$	C) 5, 12, 13	D) $10, 12, 15$

9.

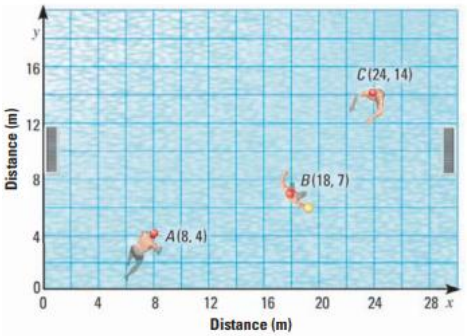
Find the exact value of $cos75^0$.

(2 marks)

A) 1	B) $\frac{\sqrt{3}}{2}$	C) $\frac{\sqrt{6}-\sqrt{2}}{4}$	D) $\frac{\sqrt{3}-\sqrt{2}}{2}$

10. The diagram shows the positions of three players during part of water polo match. Player A throws the ball to Player B, who then throws it to Player C. Find the sum of throws (the sum of distances) of Player A and Player B.

(4 marks)



A) 9.22	B) 10.44	C) 19.66	D) 18.87

11.

The third term of the geometric sequence is equal to 1 and the fifth term is 16. Find the ratio r and the seventh term.

(4 marks)

A) $r = 4, b_7 = 64$	B) $r = 2, b_7 = 128$	C) $r = 4, b_7 = 128$	D) $r = 4, b_7 = 256$

12.

Solve the simultaneous equations

$$8x - 3y = 51$$
$$3x + 4y = 14$$

(4 marks)

A) $x = 6, y = 5$	B) $x = 6, y = -2$	C) $x = 6, y = -1$	D) $x = -6, y = 1$

13. Solve for x:

$$\frac{9^{x^2} \times 27^{3x}}{3^5} = 1$$

(4 marks)

A) $x_1 = -5, x_2 = \frac{1}{2}$	B) $x_1 = 5, x_2 = -\frac{1}{2}$	C) $x_1 = -3, x_2 = 2$	D) $x_1 = -5, x_2 = -\frac{1}{2}$

14. Solve the equation

$$\log_2 x - \log_2(x-1) = 3$$

(4 marks)

A) $x = \frac{8}{7}$	B)$x = \frac{7}{8}$	C) $x = 8$	D) $x = 9$

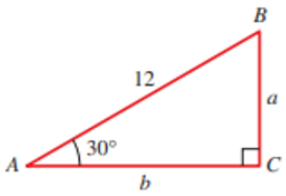
15. Find the domain of the function.

$$f(x) = \frac{1}{x^2 - x}$$

(4 marks)

A) $(\infty, 0) \cup (0, 1) \cup (1, \infty)$	B)$(\infty, 0) \cup (1, \infty)$	C) $(\infty,\ 1) \cup (1, \infty)$	D) $(\infty, -1) \cup (1, \infty)$

16. Solve the triangle.



(4 marks)

A) $a = 6, b = 6$	B) $a = 6, b = 6\sqrt{3}$	C) $a = 6, b = 8$	D) $a = 6\sqrt{3}, b = 8$

17. Simplify

$$\frac{2}{a} - \left(\frac{a+1}{a^3-1} - \frac{1}{a^2+a+1} - \frac{2}{1-a}\right) \div \frac{a^3+a^2+2a}{a^3-1}$$

(4 marks)

A) 1	B) 0	C) $\frac{1}{1-a}$	D) $\frac{2}{a^3-1}$

18.

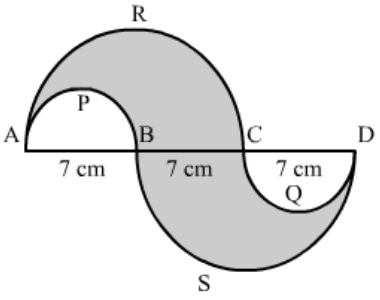
Determine the range of values of x that satisfies the following quadratic inequality.

$$6 + 5x - x^2 \geq 0$$

(6 marks)

19.

Find the area of shaded region.



(6 marks)

20. Solve the equation

$$\frac{x^2}{3} - \frac{48}{x^2} = 10\left(\frac{x}{3} - \frac{4}{x}\right)$$

(8 marks)