



UNIVERSITY OF
WESTMINSTER

Sample of Mathematics Entrance Examination 2025

DATE:
SESSION:

- 1. You have 1 hour and 30 minutes for the exam.**
- 2. Answer all questions.**
- 3. No calculators are allowed.**
- 4. For Open-ended questions 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.

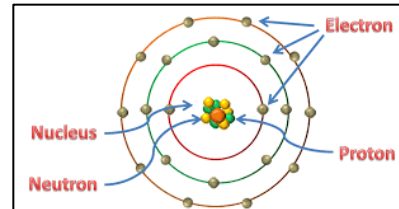
Applicant ID:

1. Find $\frac{f(x)}{g(x)}$, for $x > 3$, if $f(x) = x^3 - 9x$ and $g(x) = x^2 - 2x - 3$.

(2 marks)

a) $\frac{1}{x+1}$	b) $\frac{x+3}{x+1}$	c) $\frac{x(x-3)}{x+1}$	d) $\frac{x(x+3)}{x+1}$
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2. The total energy of an electron in orbit is the sum of its potential energy $\frac{-e^2}{r}$, in joules, and its kinetic energy $\frac{e^2}{2r}$, in joules. Which of the following gives the total energy, in joules, of an electron in orbit?



(2 marks)

a) $\frac{-e^2}{2r}$	b) $\frac{3e^2}{2r}$	c) $\frac{-e^2}{3r}$	d) $\frac{e^2(1-r)}{2r^2}$
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3. In the equation $(ax + 3)^2 = 36$, a is a constant. If $x = -3$ is one solution to the equation. What is the possible values of a ?

(2 marks)

a) -11	b) -5 and 2	c) -1 and 3	d) 0
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4. What is the solution set to the equation below.

$$x = \sqrt{4x - 3}$$

(2 marks)

a) $\{1\}$	b) $\{1, 3\}$	c) $\{3\}$	d) $\{0, 1\}$
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5. Which of the following is equivalent to the expression.

$$3(x + 2)(x - 5) + 2(x + 1)(x + 3)$$

(2 marks)

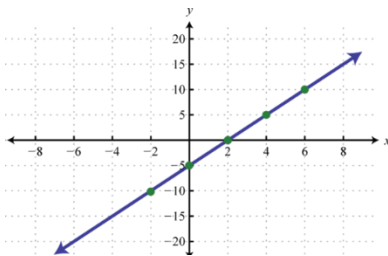
a) $5x^2 - x - 24$	b) $5x^2 - x - 39$	c) $5x^2 - x - 51$	d) $5x^4 - x - 39$
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6. Solve the equation $x^2 - 10x + 25 = 0$

(2 marks)

a) 5	b) -5	c) 5 and -5	d) 0
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7. A line is shown in the xy -plane below. Find the equation of the straight line?



(2 marks)

- a) $y = \left(\frac{2}{5}\right)x - 5$ b) $y = -5x + 2$ c) $y = -2x - 5$ d) $y = \left(\frac{5}{2}\right)x - 5$

8. In the equation below, a , b , c and d are constants.

$$ax^3 + bx^2 + cx + d = 0$$

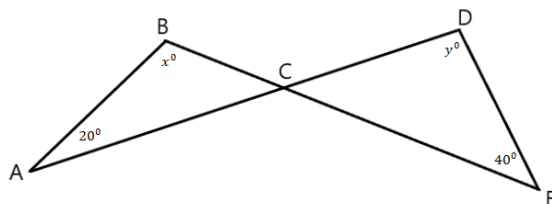
If the equation has roots -1, -3, and 5, which of the following is a factor of expression

$$ax^3 + bx^2 + cx + d.$$

(2 marks)

- a) $x - 1$ b) $x + 1$ c) $x - 3$ d) $x + 5$

9. In the figure below, AD intersects BE at point C. If $x = 100$, what is the value of y ?



(2 marks)

- a) 60 b) 80 c) 90 d) 100

10. Simplify given expression

$$\frac{2\sqrt{45} + 3\sqrt{20}}{6\sqrt{5}}$$

(2 marks)

- a) 4 b) 5 c) 2 d) 3

11. The system of equations below has no solution (x, y) . Which of the following could be the values of a and b ?

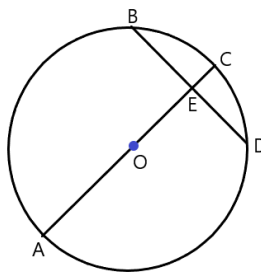
$$\begin{cases} y = \frac{1}{4}x \\ y = ax - b \end{cases} \quad (4 \text{ marks})$$

- | | | | |
|-----------------------------|-----------------------------|--------------------|--------------------|
| a) $a = \frac{1}{4}, b = 0$ | b) $a = \frac{1}{4}, b = 1$ | c) $a = -4, b = 0$ | d) $a = -4, b = 1$ |
|-----------------------------|-----------------------------|--------------------|--------------------|

12. In the circle given, point O is the center, and diameter $\overline{AC}$ bisects $\overline{BD}$ at point E.

The radius of the circle is 8, and $EC = 1$. If $BE = \sqrt{k}$, what is the value of k ?

Note that the figure is not drawn to scale.



(4 marks)

- | | | | |
|-------|-------|-------|-------|
| a) 16 | b) 64 | c) 15 | d) 49 |
|-------|-------|-------|-------|

13. A company sells each phone it produces for \$200. The company has a fixed cost of \$800 000 to produce the phones plus a cost of \$80 for each phone produced. Which of the following functions best models the profit P , in dollars, made by the company for producing and selling n phones (The Profit is total sales minus total cost).



(4 marks)

- | | |
|---------------------------|---------------------------------|
| a) $P(n) = 120n - 800000$ | b) $P(n) = 200n - 80n - 800000$ |
| c) $P(n) = 120n - 800000$ | d) $P(n) = 200n - 800000$ |

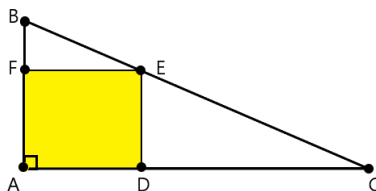
14. A group of friends decided to divide the \$800 cost of a trip equally among themselves. When two of the friends decided not to go on the trip, those remaining still divided \$800 cost equally, but each friend's share of the cost increased by \$20. How many friends were in the group originally?



(4 marks)

a)	6	b)	8	c)	10	d)	12
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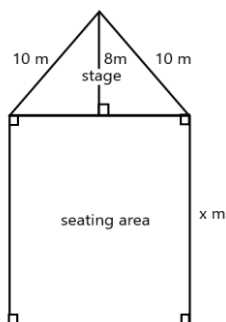
15. The right triangle ABC is given, where $AC = \frac{3}{2}AB$. If the quadrilateral AFED is a square, the area of the shaded region is what fraction of the area of triangle ABC? Note that the figure is not drawn to scale.



(4 marks)

a)	$\frac{25}{12}$	b)	$\frac{2}{3}$	c)	$\frac{13}{20}$	d)	$\frac{12}{25}$
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16. The figure below is the floor plan by an architect for a small concert hall. The stage has depth 8 meters and two walls each of length 10 meters. If the seating portion of the hall has an area of 180 meters square, what is the value of x?



(4 marks)

a)	18	b)	20	c)	15	d)	13
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17. Which of the following ordered pairs (x, y) satisfies the system of inequalities given.

$$y \leq 3x + 1 \text{ and } x - y > 1$$

(4 marks)

a)	$(-2, -1)$	b)	$(-1, 3)$	c)	$(1, 5)$	d)	$(2, -1)$
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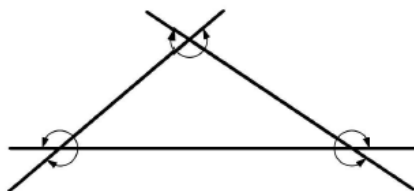
18. Solve the equation

$$\left| \frac{1}{2}x + 4 \right| = 2$$

(4 marks)

a)	-12	b)	-4	c)	$-4 \text{ and } -12$	d)	0
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19. What is the sum of the measures of the marked angles in the figure below?



(4 marks)

a)	540	b)	720	c)	900	d)	1080
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20. If $x > 4$, which of the following is equivalent to $\frac{x}{x-4} - \frac{2}{x+6}$?

(4 marks)

a)	$\frac{x-4}{x+3}$	b)	$\frac{x+8}{x-6}$	c)	$\frac{x^2 + 4x - 8}{x^2 - 2x - 24}$	d)	$\frac{x^2 + 4x + 8}{x^2 + 2x - 24}$
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21. David has two different methods of commuting to and from university: he either takes the subway, which costs \$2.75 per one-way trip, or he takes taxi, which costs \$18.50 per one-way. Last week he went to university for 5 days, commuting to and from the university each day. If his total travel cost for the week was \$74.75, how many times did he take a taxi?

(4 marks)

a)	7	b)	3	c)	6	d)	4
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22. Line L has the equation $y = 3x + c$ and line M has the equation $4y - 3x = 11 - d$, for some constants c and d . If the lines are intersected at point $P(-3, -2)$, what is the sum of c and d .

(4 marks)

a)	-7	b)	7	c)	10	d)	17
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23. In the function given k is a constant. If $f(11) = 50$, what is the value of $f(13)$?

$$f(x) = 2x^2 - 14x + k$$

(4 marks)

a)	118	b)	134	c)	88	d)	169
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24. A number of years ago, Andy purchased \$16000 worth of stock in LTD corporation. The value, in dollars, of his stock n years after purchase is given by the function V . If the stock is worth \$25000 now, roughly how many years ago did Andy purchase his stock?

$$V = 16000 \left(\frac{5}{4}\right)^n$$

(4 marks)

a)	1	b)	2	c)	3	d)	4
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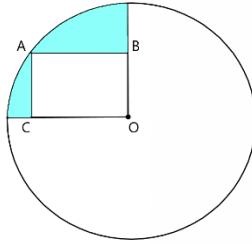
25. Which statement describes the solution of the equation?

$$\frac{6}{x^2 - 9} = \frac{2}{x - 3} - \frac{1}{x + 3}$$

(4 marks)

a)	<i>3 is the only solution</i>	b)	<i>-3 is the only solution</i>
c)	<i>3 and -3 are both solution</i>	d)	<i>No solution</i>

26. In the figure below, rectangle ABOC is drawn in circle O. If $OB = 6$ cm and $OC = 8$ cm, what is the area of the shaded region? **Please provide the details of your solution and answer.**



(6 marks)

27. Solve the exponential equation for x .

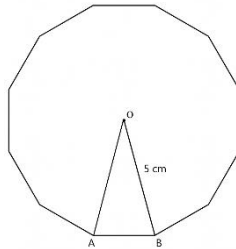
Please provide the details of your solution and answer.

$$27^x = 3^{\sqrt{x}}$$

(6 marks)

28. Find the area of a regular dodecagon (polygon that has 12 sides, 12 vertices and 12 angles) with a radius 5 cm to the nearest tenth.

Please provide the details of your solution and answer.



(8 marks)

END OF QUESTIONS