ASIAN UNIVERSITY FOR WOMEN

Mathematics (Sample Questions)

Name	Applicant ID	Country

Duration: 1.5 hours (90 minutes)
Total Marks: 100
Calculator: Not allowed

Instructions

1. Read the instructions for each question carefully.
2. For MCQs, circle ONE correct option. *Choosing more than one option will result in zero (0) marks obtained for the question*.
3. To receive maximum marks for the descriptive questions, show all necessary steps.
4. Use black/blue pens for answers, and use pencils only for rough work/sketching diagrams. *Use of a correction fluid is strictly prohibited.*
5. A separate answer booklet is provided for Section B and Section C. Indicate the question number clearly- for example, B1(A).

Section A: Core Numeracy & Algebra

Answer all 20 multiple-choice questions (MCQs), each worth 2 marks. Circle one choice only.

A1. Evaluate: $18 \div (3 \times 2) + 7 \times 4 - 5$.

A) 23 B) 24
C) 25 D) 26

A2. Simplify $\frac{3}{5} + \frac{2}{15}$.

A) $\frac{11}{15}$ B) $\frac{13}{15}$
C) $\frac{1}{3}$ D) $\frac{1}{2}$

A3. $3^2 + 4^2 = ?$

A) 12 B) 20
C) 25 D) 28

A4. If $x - 3 = 5(x - 7)$, find x.
A) -8 B) 8
C) -16 D) 16

A5. The ratio of girls to boys in a class is 4:5. Given a total of 45 students, determine the number of girls.
A) 20 B) 25
C) 28 D) 36

A6. A train travels 120 km in 2 h. Average speed = ?
A) 40 km/h B) 50 km/h
C) 60 km/h D) 70 km/h

A7. A worker earns Tk 800 per day for 8 hours of regular work. If she works overtime, she can earn Tk 50 for each overtime hour. If she works 8 regular hours and 2 hours of overtime, what is her total income for the day?
A) Tk 850 B) Tk 900
C) Tk 950 D) Tk 1000

A8. Expand $(x + 2)(x - 3)$.
A) $x^2 - x - 6$ B) $x^2 - 5$
C) $x^2 - x + 6$ D) $x^2 - 6$

A9. If $5x - 3y = 12$ and $y = 2$, find x.
A) 3.6 B) 2.8
C) 4.5 D) 6.2

A10. Simplify $\frac{45x^4y^3}{15x^2y}$.
A) $3x^2y^2$ B) x^2y^3
C) $2x^3y^2$ D) $3x^2y$

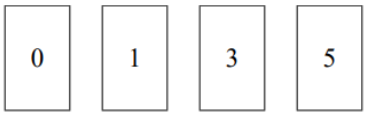
A11. Round 48.755 to the nearest tenth.
A) 48.7 B) 48.8
C) 48.75 D) 49.0

A12. If a = -2, b = 3, evaluate $3a^2 - 2b$.
A) 2 B) 4
C) 6 D) 8

A13. Convert 2.4 hours to minutes.
A) 120 B) 140
C) 144 D) 150

A14. The HCF (Highest Common Factor) of 18 and 24 is
A) 2 B) 3
C) 6 D) 12

A15. Using the four number cards shown below, which of the following can be a number between 3020 and 3200?



A) 3015 B) 3510
C) 3051 D) 5031

A16. A right-angled triangle has shorter sides 3 cm and 4 cm. The longest side is:
A) 5 cm B) 6 cm
C) 7 cm D) 8 cm

A17. The slope of the line passing through (-2,3) and (4,9) is:
A) 1 B) 2
C) 3 D) 6

A18. A circle has a radius of 7 cm. Its circumference is:
A) 7π cm B) 14π cm
C) 28π cm D) 49π cm

A19. The mean of the data 10, 12, 11, 13, 12, 11, 14, 13, 12, 11 is:
A) 11.5 B) 11.9
C) 12 D) 12.5

A20. The weekly numbers of students using the Mathematics Center are 10, 15, 20, 25, 30. If the pattern continues, the number of students in Week 6 will be:
A) 30 B) 35
C) 40 D) 45

Section B: Geometry & Applied Reasoning

Answer all 8 questions, clearly showing all necessary steps. Each question is worth 3 marks.

B1. A rectangle is such that its length is twice its width. If its perimeter is 30 cm, find its length and width.

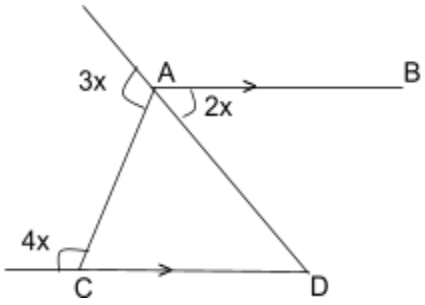
B2. A car travels at 60 km/h for 45 min. Calculate the distance travelled by the car in kilometres.

B3. Find the equation of the straight line passing through the point (1, 1) and parallel to the straight line $2x+3y+10=0$.

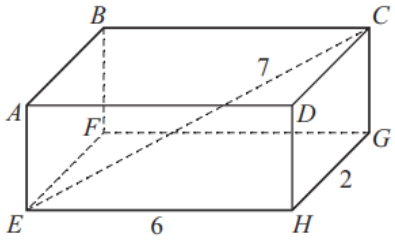
B4. In $\triangle ABC$, AB = 8 cm, AC = 6 cm, and $\angle A = 90^\circ$. Find the length of BC.

B5. Given that $\sin(\theta) = \frac{\sqrt{3}}{2}$ for $0° < \theta < 90°$, find the value of $\tan(\theta)$.

B6. In the figure below, AB || CD (**AB is parallel to CD**). Find the value of x, giving reasons for your answer.



B7. The diagram shows a cuboid, where EH = 6 cm, HG = 2 cm and EC = 7 cm.



NOT TO SCALE

Based on the figure above, calculate CG.

B8. If $\vec{u} = 3\hat{i} - 2\hat{j}$ and $\vec{v} = -\hat{i} + 4\hat{j}$,

A) Find $|\vec{u} - 2\vec{v}|$
B) Calculate $\vec{u} . \vec{v}$

Section C: Data & Analytical Thinking

Answer all 4 questions, clearly showing all necessary steps. Each question is worth 9 marks.

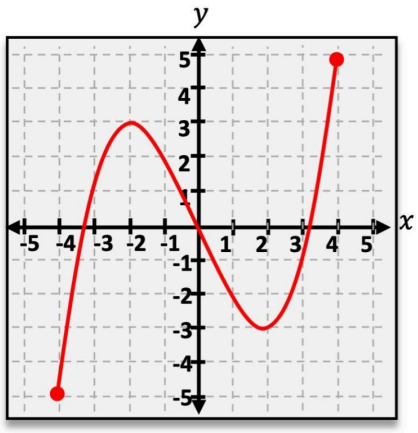
C1. **Functional Reasoning**

Let f be a function such that $f(x) = 2x^2 - 3x + 1$.

A) Compute $f(0)$ and $f(-2)$.
B) Solve $f(x) = 0$.
C) Find the equation of the axis of symmetry for $f(x)$.

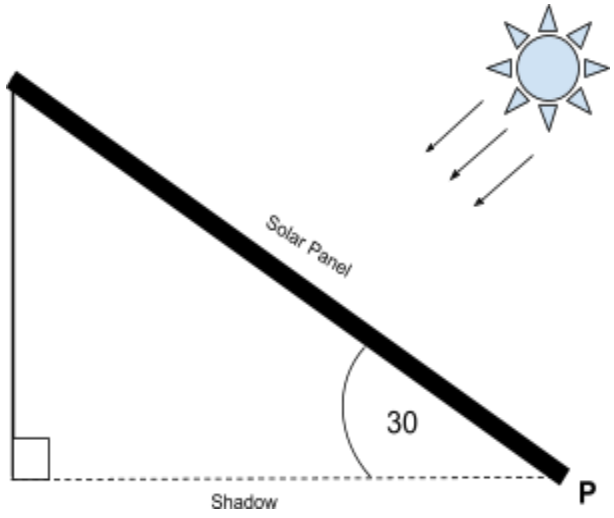
(Question C1 continued on the next page)

D) Below is a sketch of another function $g(x)$. What is its domain?



C2. Applied Modelling: Solar Panel

A solar panel of length 4 m is held at an angle of 30° to the horizontal, with one side of the panel directly touching the ground at point P. The panel, due to the sun, casts a horizontal shadow on the ground, as shown:



A) Find the vertical height of the panel above the ground.
B) Find the length of the horizontal shadow cast on the ground.

C3. Data Interpretation

The weekly number of students using the Mathematics Center is recorded as follows:

Week	1	2	3	4	5
Students	10	15	20	25	30

a) Find the mean number of students.

(Question C3 continued on the next page

b) Predict the number for Week 6 if the trend continues linearly.
c) Comment on the growth trend shown in the data and suggest one possible reason for it.

C4. **Probability and Logic**

A bag contains 3 red, 4 blue and 2 green pens. Two pens are drawn without replacement.

A) Find the probability that both pens are blue.
B) Find the probability that one pen is red and the other is green.
C) If a third pen is drawn (still without replacement), briefly explain qualitatively how the probabilities change.

Answer Booklet for Section B and Section C