



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 15 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
C) 25

- B) 24
D) 26

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

- A) $\frac{11}{15}$
C) $\frac{1}{3}$

- B) $\frac{13}{15}$
D) $\frac{1}{2}$

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

- A) 12
C) 25

- B) 20
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

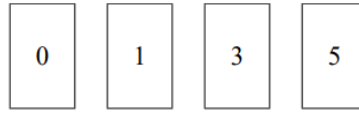
A13. Convert 2.4 hours to minutes.

- 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
C) 3051

- B) 3510
D) 5031

Section B: Geometry & Applied Reasoning

Answer all 10 questions, clearly showing all necessary steps. Each question is worth 3 marks.

B1. A right-angled triangle has lengths 3 cm and 4 cm as its shorter sides.

- (a) Find the length of the longest side (**that is, the side opposite to the right angle**).
(b) Calculate the area of the triangle.

B2. A circle has a radius of 7 cm. Find, in terms of π :

- (a) its circumference
(b) its area.

B3. A rectangle is such that its length is twice its width. If its perimeter is 30 cm, find its length and width.

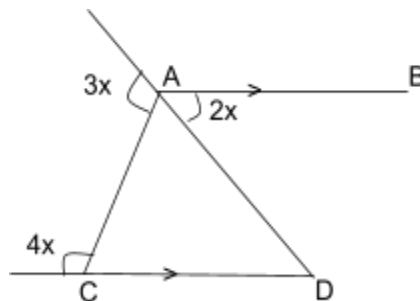
B4. A car travels at 60 km/h for 45 min. Calculate the distance travelled by the car in kilometres.

B5. Find the slope of the straight line passing through the points $(-2, 3)$ and $(4, 9)$.

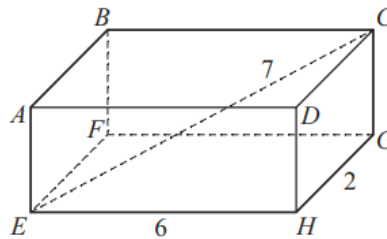
B6. In $\triangle ABC$, $AB = 8$ cm, $AC = 6$ cm, and $\angle A = 90^\circ$. Find the length of BC .

B7. Given that $\sin(\theta) = \frac{\sqrt{3}}{2}$ for $0^\circ < \theta < 90^\circ$, find the value of $\tan(\theta)$.

B8. In the figure below, $AB \parallel CD$ (**AB is parallel to CD**). Find the value of x , giving reasons for your answer.



B9. The diagram shows a cuboid, where $EH = 6$ cm, $HG = 2$ cm and $EC = 7$ cm.



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Based on the figure above, calculate CG.

B10. 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 $\vec{u} \cdot \vec{v}$

Section C: Data & Analytical Thinking

Answer all 5 questions, clearly showing all necessary steps. Each question is worth 8 marks.

C1. Statistics

The ages, in years, of 10 students in a class are as follows:

10, 12, 11, 13, 12, 11, 14, 13, 12, 11

- A) Find the mean age.
- B) Find the median age.
- C) Find the modal age.
- D) Find the range of the data.
- E) How many students are older than the mean?

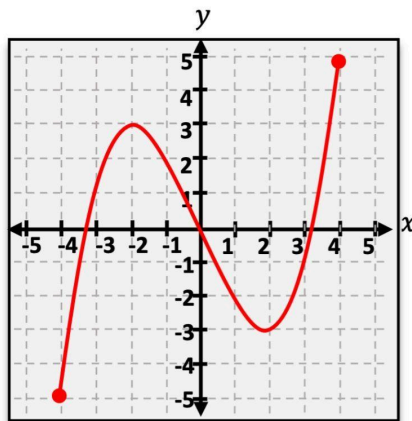
C2. Functional Reasoning

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 $f(x)$.

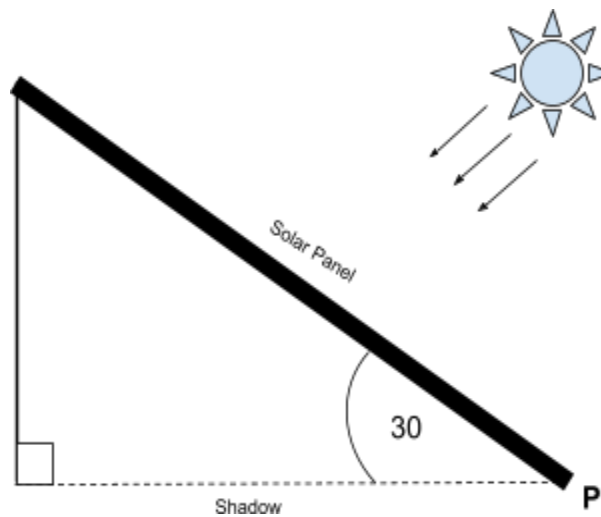
(Question C2 continued on the next page)

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



C3. 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.

C4. 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.
- 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.

C5. 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. -sample
- C) If a third pen is drawn (still without replacement), briefly explain qualitatively how the probabilities change.

Section	Marks	Suggested Time	Skills
A. Core Numeracy & Algebra	30	20 mins	Procedural fluency
B. Geometry & Applied Reasoning	30	30 mins	Spatial/Applied reasoning
C. Data & Analytical Thinking	40	40 mins	Conceptual Modelling
Total	100	90 mins	

Answer Booklet for Section B and Section C