Grade-8 IB Entrance – Full Mock #1

Total Time: 90 minutes
Do not open this booklet until told to begin.
You may write in the booklet. Calculators and electronic devices are **not** permitted.

Section	Recommended Time	Questions	Marks
A. Mathematics	45 min	15	60
B. English Language	60 min	19	46
C. Verbal & Non-Verbal Reasoning	15 min	20	20

Use the separate answer grid for multiple-choice questions. For Mathematics, show all working in the space provided to receive full credit.

Section A – Mathematics (45 min, 60 marks)

Answer on the lined pages. Show all steps—unsupported answers earn 0 marks.

1. **Fraction bakery** – A bakery uses $3\frac{3}{4}$ kg of flour to bake 5 identical loaves.
   a) How much flour is used per loaf? (2 m)
   b) The baker wants to package 24 such loaves for a school fair. How many **kilograms** of flour will be required in total? (2 m)

2. **Consecutive totals** – The sum of four consecutive integers is 262. Find the integers. (3 m)

3. **Speed-distance puzzle** – A train leaves Montreal at 08:00 travelling 90 km/h toward Ottawa (200 km away). Ten minutes later a second train leaves Ottawa toward Montreal at 110 km/h.
   a) At what time (to the nearest minute) do the trains meet? (3 m)
   b) How far from Montreal do they meet? (1 m)

4. **Polygon angles** – A regular polygon has each interior angle equal to 150°.
   a) How many sides does the polygon have? (2 m)
   b) What is the sum of all its exterior angles? (1 m)

5. **Shaded rings** – A circular garden has a radius of 9 m. A path of uniform width is laid **inside** the perimeter so that the remaining grassed area is 128π m². Find the width of the path. (4 m)

6. **Bag of marbles** – A bag contains red, blue and green marbles in the ratio 5 : 4 : 3. If there are 48 marbles altogether and two are drawn **without replacement**, compute the probability that they are different colours. (4 m)

7. **Coordinate transformation** – Triangle PQR has vertices P(–2, 1), Q(4, 1) and R(1, 5). It is mapped by the composite transformation *rotation 90° anticlockwise about the origin followed by reflection in the y-axis*.
   a) Plot and label P′Q′R′. (diagram) (2 m)
   b) State the coordinates of P″Q″R″ after the composite transformation. (2 m)

8. **Algebraic substitution** – If g(x)=3x+7, find:
   a) g(4) (1 m)
   b) g(a+2) in terms of a. (2 m)

9. **Composite volume** – A solid is formed by joining a right circular cone (radius 3 cm, height 8 cm) to the top of a cylinder (same radius, height 12 cm). Find the total volume in cm³, leaving your answer in terms of π. (3 m)

10. **System of equations** – Solve for real numbers x and y (4 m):

$$2x + 3y = 17$$

$$4x - 2y = 6$$

11. **Arithmetic-geometric mix** – The nth term of a sequence is $u_n = 5 + 3 \times 2^{n-1}$.
   a) Write the first four terms. (2 m)
   b) Determine the smallest n for which $u_n > 200$. (2 m)

12. **Statistics snapshot** – The set {4, 7, 9, x, 15, 18, 21} has mean 12. Find the value of x and the median of the completed set. (3 m)

13. **Painted cube** – A wooden cube of side 6 cm is painted on all faces and then cut into 216 smaller cubes of equal size.
   a) How many of the small cubes have paint on exactly two faces? (2 m)
   b) What fraction of the total volume has no paint? (2 m)

14. **Pythagoras on the slope** – A wheelchair ramp rises 1.2 m over a horizontal distance of 9 m. Calculate the length of the ramp to one decimal place and its angle of elevation to the nearest degree. (3 m)

15. **Challenge – probability grid** – A 3 × 3 grid is filled with the digits 1 to 9, each used exactly once. What is the probability that the three-digit number formed by the top row is divisible by 3? Give your answer as a simplified fraction. (4 m)

Section B – English Language (60 min, 46 marks)

Part I • Writing Task (40 min, 24 marks)

You will be given **two prompts**—one photographic image and one quotation. Choose **ONE** and write a focused analytical or persuasive paragraph of **180–220 words**. Use specific evidence or reasoning to support your position.

Visual Prompt (for practice only):

Quotation (for practice only):
"We do not inherit the earth from our ancestors; we borrow it from our children." — Native Proverb

Assessment Criteria

Criterion	Marks
Insight & Relevance	10
Structure & Coherence	6
Language Control (grammar, vocabulary, mechanics)	8

Write your response on the lined pages provided. Plan briefly; use paragraphs; proof-read.

Part II • Grammar & Vocabulary (10 min, 12 marks)

For each sentence below, choose the best option A–D to complete the blank.

1. The principal urged students to embrace the _____ of lifelong learning.
   A) spectacle B) principle C) particle D) miracle

2. Even the smallest lantern can _____ the darkest cave.
   A) eliminate B) illuminate C) implicate D) imitate

3. The hikers were _____ when the trail markers suddenly vanished.
   A) disoriented B) delighted C) determined D) distributed

4. Clara objected to _____ treated as an afterthought.
   A) be B) been C) being D) to be

5. Renewable energy offers a viable _____ to fossil fuels.
   A) alternate B) alternative C) alteration D) alternation

6. Neither the rain nor the thunder _____ the outdoor concert.
   A) was delaying B) have delayed C) has delayed D) were delaying

7. Critics claimed the novel's plot was too _____ to follow.
   A) convoluted B) candid C) concise D) coherent

8. The committee reached a _____ decision after hours of discussion.
   A) unanimous B) uniform C) unilateral D) uncertain

9. The scientists recorded data at _____ intervals throughout the experiment.
   A) irregular B) regular C) relative D) relational

10. By the time we arrived, the guests had _____ left.
    A) already B) yet C) still D) almost

11. The charity relies _____ on volunteer support to run its programs.
    A) heavily B) heavy C) heavier D) heaviness

12. Sam's explanation was so _____ that everyone immediately understood the process.
    A) succinct B) obscure C) verbose D) ambiguous

Part III • Reading Comprehension (10 min, 10 marks)

Read the passage below and answer Questions 13–18.

Urban Oases: The Quiet Rise of Community Rooftop Gardens

Paragraph 1 – Across Canada's densest cities, the once-forlorn rooftops of apartment blocks are sprouting life. From Vancouver's drizzly West End to Montreal's sweeping Plateau, residents are converting concrete deserts into verdant sanctuaries. Raised cedar beds line parapet walls, plastic barrels catch summer rain, and pollinator-friendly marigolds nod beside heirloom tomatoes. What began as a handful of guerrilla planters sneaking compost up fire-stairs has matured into a nationwide trend that blurs the line between high-rise living and small-scale agriculture.

Paragraph 2 – The movement's seed was sown in 2012 when a group of Toronto high-school students set out to reduce their building's oppressive heat-island effect. By covering asphalt with soil and vegetation, they lowered rooftop temperatures by ten degrees Celsius, slashing the need for air-conditioning. The environmental win drew media attention, but the unexpected harvest of cherry tomatoes and basil proved even more compelling, inspiring neighbouring towers to plant their own plots.

Paragraph 3 – Beyond carbon savings, rooftop gardens cultivate social cohesion. Tenants who once exchanged only cursory nods in the elevator now gather on Saturday mornings to weed and water collectively. Newcomer families share recipes from their home countries; retirees teach children how to judge a melon's ripeness. Researchers at the University of British Columbia recorded a forty-percent increase in reported "sense-of-community" scores among participants after just one growing season—a statistic city planners now cite when drafting green-roof bylaws.

Paragraph 4 – Ecologists highlight another benefit: **micro-climates**. At thirty metres above street level, wind patterns, sunlight intensity and temperature differ markedly from backyard conditions. Hardy kale varieties thrive while lettuce wilts; dwarf fruit trees, protected by windbreak trellises, yield surprisingly sweet peaches. These idiosyncrasies create miniature laboratories where citizens gather data for academic partners, contributing to studies on urban biodiversity, storm-water retention and pollinator corridors that criss-cross skylines like unseen highways.

Paragraph 5 – Progress, however, is not without impediments. Municipal safety codes restrict load-bearing limits, and insurance premiums spike if railings rise below provincial standards. Some property managers worry about root systems compromising waterproof membranes. Others balk at start-up costs: an engineered green-roof system can exceed $200 per square metre. To overcome these hurdles, nonprofits such as Rooftops Canada offer micro-grants and volunteer engineers, while Montreal's 2024 by-law grants a twenty-percent tax rebate to buildings that dedicate at least fifty percent of roof space to vegetation.

Paragraph 6 – As climate projections grow bleaker, the appeal of productive roofscapes is likely to intensify. Civil engineers envision modular planters that clip together like LEGO, allowing even decades-old towers to retrofit beds without structural reinforcement. School boards are drafting curricula that send students upstairs to measure soil pH and calculate photosynthetic rates with handheld sensors. In the words of urbanist Maya Desai, "The future Canadian city

won’t merely be concrete stitched with parks—it will be a living canopy that starts where the elevator buttons run out.”

Questions 13–18 *(Each worth 1 mark)*

13. According to Paragraph 2, what was the initial motivation for establishing the first rooftop gardens in Toronto?
14. Which phrase in the passage best illustrates the idea of “micro-climate”?
15. The author’s tone in describing municipal bylaws is best described as: A) celebratory B) critical C) detached D) humorous
16. In Paragraph 4, the word **“ramifications”** most nearly means: A) repercussions B) celebrations C) foundations D) decorations
17. Which of the following statements is **NOT** supported by the information in the passage?
18. What is the main purpose of the final paragraph?
19. According to Paragraph 2, what was the initial motivation for establishing the first rooftop gardens in Toronto?
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23. Which of the following statements is **NOT** supported by the information in the passage?
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Section C – Verbal & Non-Verbal Reasoning (15 min, 20 marks) (15 min, 20 marks)

Choose the best answer A–D and record it on your answer grid.

67. **Analogy** – GLIMMER is to SHINE as WHISPER is to:
    A) murmur B) shout C) silence D) speak

68. **Odd-one-out** – Find the word that does **not** belong:
    A) hexagon B) pentagon C) octagon D) polygon

69. **Number sequence** – 3, 11, 23, 39, 59, ?
    A) 71 B) 83 C) 91 D) 101

70. **Letter code** – Using the same rule that maps PLAN → QMBM, what is the code for WORD?
    A) XPQD B) XPSF C) VNPC D) XPRF

71. **Syllogism** – All orchids are flowers. Some flowers are scented. Therefore:
    A) All orchids are scented. B) Some orchids are scented. C) No orchids are scented. D) Some orchids are not scented.

72. **Analogy** – BARK is to TREE as FUR is to:
    A) cat B) branch C) skin D) root

73. **Odd-one-out** – Which instrument is different from the others?
    A) violin B) guitar C) flute D) cello

74. **Number sequence** – 2, 5, 10, 17, 26, ?
    A) 35 B) 37 C) 38 D) 40

75. **Letter code** – In a cipher where each letter is replaced by the next letter in the alphabet, what is the code for GRAIN?
    A) HSBJO B) HBSAO C) HRBJO D) HSBIO

76. **Logic deduction** – All squares are rectangles. Some rectangles are rhombuses. Which conclusion is **always** true?
    A) All squares are rhombuses. B) Some rhombuses are squares. C) No squares are rhombuses. D) Some rectangles are squares.

77. **Directions** – A robot starts facing NORTH. It turns right, walks 3 m, turns right again, walks 2 m, turns left, walks 1 m, and finally turns left. Which direction is it now facing?
    A) North B) South C) East D) West

78. **Letter pair sequence** – AZ, BY, CX, DW, ?
    A) EV B) UF C) VX D) XE

79. **Magic square** – In the grid below, each row, column and diagonal add to the same total. Find the missing number.
    4 9 2
    3 ? 7
    8 1 6
    A) 5 B) 4 C) 2 D) 9

80. **Analogy** – FRUGAL is to THRIFTY as HAVOC is to:
    A) chaos B) calm C) order D) peace

81. **Number pattern** – 1, 4, 9, 16, 25, ?
    A) 30 B) 32 C) 36 D) 49

82. **Syllogism** – All metals are elements. Gold is a metal. Which statement is true?
    A) Gold is an element. B) All elements are gold. C) Some elements are metals. D) Both A and C.

83. **Letter-value code** – If CAT = 24 and DOG = 26 (sum of letter positions), what is FROG?
    A) 42 B) 46 C) 48 D) 52

84. **Directions** – Facing EAST, you turn 90° clockwise, walk 4 m, turn 180°, walk 4 m, then turn 90° counter-clockwise. Which direction are you now facing?
    A) North B) South C) East D) West

85. **Proportion** – 8 : 4 as 18 : ?
    A) 6 B) 7 C) 9 D) 12

86. **Word formation** – Which of the following words **cannot** be formed using the letters of CONSEQUENCE?
    A) once B) sequin C) ounce D) scene

(End of Section C)

End of Paper

(Please ensure you have attempted all questions and that your name is on every sheet.)