

MATHAbhyas

Where Practice Becomes Mastery.

QUEENSLAND SELECTIVE SCHOOL ENTRANCE EXAMINATION

Sample Worksheet

Section	Detail
Section A — Mathematical Reasoning	8 Questions · 1 mark each
Section B — Reasoning Ability	6 Questions · 1 mark each
Section C — Challenge Zone	4 Questions · 2 marks each
Section D — Scholarship Challenge	2 Questions · 4 marks each
Total	20 Questions · 30 Marks
Recommended Time	35 Minutes
Calculator	Not Permitted

Student Details

Name:	_____
Date:	_____ School: _____
Year Level:	_____ Start Time: _____ Finish Time: _____

Instructions

- Sections A & B: Choose the best answer. Write the letter clearly.
- Sections C & D: Show all working — method marks are awarded even if the final answer is wrong.
- No penalty for guessing. Attempt every question.
- Tick the confidence box after each question.

SECTION A
Mathematical Reasoning
8 Questions · 1 Mark Each

Q1 [Number]

Which of the following is divisible by both 9 and 8?

(A) 54

(B) 96

(C) 72

(D) 120

My answer: () **Confidence:** • Sure • Think so • Guessed

Q2 [Fractions]

A school has 1,248 students. Three-eighths of them walk to school. How many students walk?

(A) 312

(B) 416

(C) 468

(D) 156

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION A (continued)
Mathematical Reasoning
8 Questions · 1 Mark Each

Q3 [Ratio]

Simplify the ratio 84 : 56 : 28.

(A) 3 : 2 : 1

(B) 6 : 4 : 2

(C) 4 : 3 : 2

(D) 7 : 5 : 3

My answer: () **Confidence:** • Sure • Think so • Guessed

Q4 [Rate]

A car travels 270 km at an average speed of 90 km/h. How long does the journey take?

(A) 2 hours

(B) 2 hours 30 minutes

(C) 3 hours

(D) 3 hours 30 minutes

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION A (continued) Mathematical Reasoning

8 Questions · 1 Mark Each

Q5 [BIDMAS]

What is the value of $4 \times (3^2 + 7) - 2^3$?

(A) 56

(B) 60

(C) 48

(D) 64

My answer: () **Confidence:** • Sure • Think so • Guessed

Q6 [Geometry]

A rectangle has a perimeter of 48 cm. Its length is 3 cm more than twice its width. What is the area of the rectangle?

(A) 119 cm²

(B) 108 cm²

(C) 126 cm²

(D) 136 cm²

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION A (continued)
Mathematical Reasoning
8 Questions · 1 Mark Each

Q7 [Financial Maths]

Find the simple interest earned on \$3,500 invested at 6% per annum for 2 years.

(A) \$210

(B) \$420

(C) \$252

(D) \$350

My answer: () **Confidence:** • Sure • Think so • Guessed

Q8 [Ratio]

A jar contains red, blue, and green marbles in the ratio 4 : 3 : 2. There are 18 blue marbles. What is the total number of marbles?

(A) 36

(B) 45

(C) 54

(D) 81

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION B
Reasoning Ability
6 Questions · 1 Mark Each

Q9 [Number Series]

Find the missing number: 2, 5, 11, 23, ____, 95

(A) 43

(B) 47

(C) 45

(D) 49

My answer: () **Confidence:** • Sure • Think so • Guessed

Q10 [Matrix]

Complete the matrix. Each row follows the same rule. Row 1: [3, 5, 8] Row 2: [4, 7, 11] Row 3: [6, 9, ?]

(A) 13

(B) 14

(C) 15

(D) 16

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION B (continued)

Reasoning Ability

6 Questions · 1 Mark Each

Q11 [Coding]

Using the code A=1, B=2 ... Z=26, MATHS is coded as 13-1-20-8-19. Using the same rule, what is the code for EXAM?

(A) 5-24-1-13

(B) 5-23-1-12

(C) 4-24-1-13

(D) 5-24-2-13

My answer: () **Confidence:** • Sure • Think so • Guessed

Q12 [Analogy]

36 is to 6 as 144 is to ____

(A) 12

(B) 18

(C) 24

(D) 9

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION B (continued)

Reasoning Ability

6 Questions · 1 Mark Each

Q13 [Classification]

Which number is the odd one out? 27, 64, 125, 144, 216

(A) 27

(B) 64

(C) 144

(D) 216

My answer: () **Confidence:** • Sure • Think so • Guessed

Q14 [Logic]

All members of Team A wear blue caps. Sarah wears a blue cap. Which conclusion is logically valid?

(A) Sarah is definitely in Team A

(B) Sarah is definitely not in Team A

(C) Sarah may or may not be in Team A

(D) No conclusion can be drawn at all

My answer: () **Confidence:** • Sure • Think so • Guessed

SECTION C Challenge Zone

4 Questions · 2 Marks Each

Tip: Full working shown earns method marks even if the final answer contains a minor error.

Q15 [Algebra]

A two-digit number has a digit sum of 11. When its digits are reversed, the new number is 27 greater than the original. Find the original number. Show all algebraic working.

Working space:

Answer

:

SECTION C (continued)
Challenge Zone
4 Questions · 2 Marks Each

Q16 [Word Problem]

Alex, Blake, and Casey share the cost of a gift.

- Alex pays twice as much as Blake.
- Casey pays \$12 more than Blake.
- Total cost is \$84.

Set up an equation and find how much each person pays.

Working space:

Answer

:

SECTION C (continued)
Challenge Zone
4 Questions · 2 Marks Each

Q17 [Geometry]

A right-angled triangle has legs of 9 cm and 12 cm.

- (a) Find the length of the hypotenuse.
- (b) Find the area of the triangle.
- (c) A circle is drawn with the hypotenuse as its diameter. Find its area to 2 decimal places. (Use $\pi = 3.14$)

Working space:

Answer

:

SECTION C (continued)
Challenge Zone
4 Questions · 2 Marks Each

Q18 [Sequences]

A sequence is: 5, 9, 14, 20, 27, ...

- (a) Find the first differences. What pattern do you notice?
- (b) Find the next two terms.
- (c) Find the n^{th} term formula. Show all working and verify against at least two terms.

Working space:

Answer

:

SECTION D
Scholarship Challenge
2 Questions · 4 Marks Each

Note: These questions extend the most able students. Partial credit is awarded for correct reasoning.

Q19 [Algebra & Geometry]

A rectangular swimming pool is 24 m long and 10 m wide. It is surrounded by a uniform concrete path of width x metres. The area of the path equals the area of the pool.

- (a) Write an expression for the area of the path in terms of x .
- (b) Show this leads to: $4x^2 + 68x - 240 = 0$
- (c) Divide by 4 and solve by factorising. Reject any negative solution.
- (d) State the path width and find the outer dimensions of the pool and path combined.

Working space:

Answer

:

SECTION D (continued)
Scholarship Challenge
2 Questions · 4 Marks Each

Q20 [Sets & Probability]

In a class of 30 students, every student studies at least one of Maths, Science, or English.

- 18 study Maths • 16 study Science • 12 study English
- 8 study both Maths and Science • 6 study both Science and English
- 5 study both Maths and English • 3 study all three subjects

(a) Use inclusion–exclusion to verify all 30 students are accounted for.

(b) How many students study only Maths?

(c) How many students study exactly two subjects?

(d) Find the probability that a randomly chosen student studies only one subject.

Working space:

Answer

:

ANSWER KEY & MARKING GUIDE

Section A — Mathematical Reasoning (Multiple Choice)

Q	Ans	Full Worked Solution
Q1	C — 72	$72 \checkmark 9 = 8$ (integer) and $72 \checkmark 8 = 9$ (integer). \checkmark Both conditions satisfied.
Q2	C — 468	$\frac{3}{8} \times 1248 = 3 \times 156 = 468$ students.
Q3	A — 3:2:1	HCF of 84, 56, 28 is 28. $\rightarrow 84 \checkmark 28 : 56 \checkmark 28 : 28 \checkmark 28 = 3 : 2 : 1$.
Q4	C — 3 hours	Time = Distance \checkmark Speed = $270 \checkmark 90 = 3$ hours.
Q5	A — 56	$4 \times (3^2 + 7) - 2^3 = 4 \times (9 + 7) - 8 = 4 \times 16 - 8 = 64 - 8 = 56$.
Q6	A — 119 cm ²	$2(w + 2w + 3) = 48 \rightarrow 6w + 6 = 48 \rightarrow w = 7, L = 17$. Area = $17 \times 7 = 119$ cm ² .
Q7	B — \$420	$I = P \times r \times t = 3500 \times 0.06 \times 2 = \420 .
Q8	C — 54	Blue = 3 parts = 18 marbles \rightarrow 1 part = 6. Total = 9 parts \times 6 = 54 marbles.

Section B — Reasoning Ability (Multiple Choice)

Q	Ans	Full Worked Solution
Q9	B — 47	Rule: $\times 2$ then $+1$. $2 \rightarrow 5 \rightarrow 11 \rightarrow 23 \rightarrow 47 \rightarrow 95$. \checkmark
Q10	C — 15	Rule: 3rd = 1st + 2nd. Row 3: $6 + 9 = 15$. \checkmark
Q11	A — 5-24-1-13	E=5, X=24, A=1, M=13. Code: 5-24-1-13. \checkmark
Q12	A — 12	Rule: square root. $\sqrt{36} = 6$; $\sqrt{144} = 12$. \checkmark
Q13	C — 144	$27=3^3, 64=4^3, 125=5^3, 216=6^3$ are all perfect cubes. $144=12^2$ is not a perfect cube.
Q14	C	Converse fallacy: Team A wears blue, but not everyone wearing blue is in Team A. Sarah may or may not be in Team A.

Section C — Challenge Zone (Open-Ended, 2 marks each)

Q15 [Algebra]

Answer: The original number is 47.

- Let the tens digit = a and units digit = b. Then: $a + b = 11$ and original number = $10a + b$.
- When digits are reversed: new number = $10b + a$.
- Condition: $(10b + a) - (10a + b) = 27 \rightarrow 9b - 9a = 27 \rightarrow b - a = 3$.
- Solve simultaneously: $a + b = 11$ and $b - a = 3 \rightarrow 2b = 14 \rightarrow b = 7, a = 4$.
- Original number = 47. Verification: reversed = 74; $74 - 47 = 27$. \checkmark

Q16 [Word Problem]

Answer: Blake = \$18, Alex = \$36, Casey = \$30.

1. Let Blake's amount = x . Then Alex = $2x$ and Casey = $x + 12$.
2. Equation: $x + 2x + (x + 12) = 84 \rightarrow 4x + 12 = 84 \rightarrow 4x = 72 \rightarrow x = 18$.
3. Blake = \$18, Alex = $2 \times \$18 = \36 , Casey = $\$18 + \$12 = \$30$.
4. Verification: $\$18 + \$36 + \$30 = \84 . ✓

Q17 [Geometry]

Answer: (a) 15 cm (b) 54 cm² (c) 176.63 cm²

1. (a) Hypotenuse: $c^2 = 9^2 + 12^2 = 81 + 144 = 225 \rightarrow c = \sqrt{225} = 15$ cm. ✓ (Pythagorean triple 3-4-5 scaled by 3)
2. (b) Area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 9 \times 12 = 54$ cm².
3. (c) Diameter = 15 cm \rightarrow radius = 7.5 cm. Area = $\pi \times r^2 = 3.14 \times 7.5^2 = 3.14 \times 56.25 = 176.625 \approx 176.63$ cm².

Q18 [Sequences]

Answer: (b) 35 and 44. (c) $T(n) = (n+1)(n+4)/2$

1. (a) First differences: 4, 5, 6, 7. Pattern: differences increase by 1 each time (second difference = 1, constant \rightarrow quadratic sequence).
2. (b) Next differences: 8 and 9. Terms: $27+8 = 35$, then $35+9 = 44$.
3. (c) Since 2nd difference = 1, coefficient of n^2 is $\frac{1}{2}$. Assume $T(n) = \frac{1}{2}n^2 + bn + c$.
4. $T(1) = 5: \frac{1}{2} + b + c = 5 \rightarrow b + c = 4.5$. $T(2) = 9: 2 + 2b + c = 9 \rightarrow 2b + c = 7$.
5. Subtracting: $b = 2.5, c = 2$. $\therefore T(n) = \frac{1}{2}n^2 + 2.5n + 2 = (n^2 + 5n + 4)/2 = (n+1)(n+4)/2$.
6. Verification: $T(1) = (2 \times 5)/2 = 5$ ✓. $T(5) = (6 \times 9)/2 = 27$ ✓.

Section D — Scholarship Challenge (Open-Ended, 4 marks each)

Q19 [Algebra & Geometry]

Answer: Path width $x = 3$ m. Outer dimensions: 30 m \times 16 m.

1. (a) Area of outer rectangle = $(24 + 2x)(10 + 2x)$. Area of path = $(24+2x)(10+2x) - 240$.
2. (b) Set path area = pool area (240 m^2): $(24+2x)(10+2x) - 240 = 240$.
3. Expand: $240 + 48x + 20x + 4x^2 - 240 = 240 \rightarrow 4x^2 + 68x = 240 \rightarrow 4x^2 + 68x - 240 = 0$. ✓
4. (c) Divide by 4: $x^2 + 17x - 60 = 0$. Factorise: $(x + 20)(x - 3) = 0$.
5. Solutions: $x = -20$ (rejected, negative) or $x = 3$. $\therefore x = 3$ m.
6. (d) Outer length = $24 + 2(3) = 30$ m. Outer width = $10 + 2(3) = 16$ m.
7. Verification: Outer area = $30 \times 16 = 480$. Path area = $480 - 240 = 240 = \text{pool area}$. ✓

Q20 [Sets & Probability]

Answer: (b) 8 study only Maths (c) 10 study exactly two subjects (d) P = 17/30

1. (a) $|MuSuE| = 18+16+12 - 8-6-5 + 3 = 46 - 19 + 3 = 30$. ✓ All students accounted for.
2. (b) Only Maths = $|M| - |MnS| - |MnE| + |MnSnE| = 18 - 8 - 5 + 3 = 8$.
3. Only Science = $16 - 8 - 6 + 3 = 5$. Only English = $12 - 6 - 5 + 3 = 4$.
4. (c) Exactly M & S only = $8-3 = 5$. Exactly S & E only = $6-3 = 3$. Exactly M & E only = $5-3 = 2$.
5. Exactly two subjects = $5 + 3 + 2 = 10$.
6. (d) Study only one subject = $8 + 5 + 4 = 17$. $P(\text{only one}) = 17/30$.
7. Verification: $8+5+4+10+3 = 30$. ✓

Scoring Guide

Score / 30	Percentage	Readiness Level
0 - 14	0 - 46%	<input type="checkbox"/> Emerging
15 - 19	50 - 63%	<input type="checkbox"/> Developing
20 - 24	67 - 80%	<input type="checkbox"/> Competitive
25 - 27	83 - 90%	<input type="checkbox"/> Selective Ready
28 - 30	93 - 100%	<input type="checkbox"/> Scholarship Level

Section A = 8 marks · Section B = 6 marks · Section C = 8 marks · Section D = 8 marks · Total = 30 marks