General Mathematics 2019 v1.2

Unit 1 sample assessment instrument

April 2019

Examination

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Schools develop internal assessments for each senior subject, based on the learning described in Units 1 and 2 of the subject syllabus. Each unit objective must be assessed at least once.

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

1. select, recall and use facts, rules, definitions and procedures drawn from all Unit 1 topics

2. comprehend mathematical concepts and techniques drawn from all Unit 1 topics

3. communicate using mathematical, statistical and everyday language and conventions

4. evaluate the reasonableness of solutions

5. justify procedures and decisions by explaining mathematical reasoning

6. solve problems by applying mathematical concepts and techniques drawn from all Unit 1 topics.

Subject	General Mathematics
Technique	Examination
Unit	1: Money, measurement and relations
Topic	1: Consumer arithmetic 2: Shape and measurement 3: Linear equations and their graphs

Conditions			
Response type	Short-response format — single word, sentence or short paragraph		
Time	120 minutes	**Perusal**	5 minutes
Other	• Only the QCAA formula sheet must be provided • Access to a handheld scientific calculator is required (no other form of technology is permitted) • Notes are not permitted		

Instructions

• Write responses using black or blue pen.
• Complete your responses in the spaces provided.
• Show all working to support answers; justify solutions using appropriate mathematical language where appropriate.
• Use additional pages if you need more space for your responses
   – To cancel an incorrect response, rule a single diagonal line through your work. If you fail to do this, your original response will be marked.
   – Note the page number of your additional response, i.e. *See page …*

Criterion	Marks allocated	Result
Foundational knowledge and problem-solving Assessment objectives 1, 2, 3, 4, 5, 6		

Part A — Simple familiar

Question 1 (3 marks)

The formula for simple interest is $I = Pin$.

    a.   Rearrange this formula to make n the subject of the formula.

    b.   Determine the number of years that $1200 should be invested at 5% p.a. to earn $360 interest.

Question 2 (3 marks)

Calculate the original price of an article that has been sold at $56.25 if a 25% discount has been applied.

Question 3 (2 marks)

A cube has a volume of 8 cm³. Determine its volume in mm³.

Question 4 (3 marks)

Determine the total cost for a 20.5 km taxi trip if the flag fall is $3 and the cost per km is $2.20.

Question 5 (4 marks)

An entertainment system marked at $2360 is discounted by 35%.

    a. Determine the discount amount in dollars.

    b. Calculate the new price of the system.

Question 6 (5 marks)

Abigail makes necklaces out of beads. She has a choice of two brands of beads.

Brand A costs $7.50 for a box of 1000 beads. Brand B costs $17.50 for a box of 2500 beads.

    a. Use the unit cost method to identify which brand is the better buy.

    b. If Brand A was on sale with a discount of 10%, how would this affect the best buy option?

Question 7 (5 marks)

Draw a step graph to represent the parking costs shown on this sign for a New York car park.
Do not include the lost ticket charge.

Parking fees Turbo Garage	
Hours	**Rate ($)**
0–2	23
>2–4	35
Each additional hour	20
Maximum daily charge	100
Lost ticket charge	36
Pay at front desk prior to departure.	

Question 8 (2 marks)

Kate is going to Singapore. She needs to exchange 650 Australian dollars for Singapore dollars.
Calculate how much she will receive.

Currency exchange table — units of foreign currency per Australian dollars

Country	Currency	Sell rate
USA	US dollar	0.7462
European Union	Euro	0.6631
United Kingdom	pounds sterling	0.5503
Thailand	Thai baht	24.5939
Singapore	Singapore dollar	0.9799
Indonesia	Indonesian rupiah	9475.9678
Japan	Japanese yen	75.1314
Fiji	Fijian dollar	1.5019
China	Chinese renminbi	4.6701
New Zealand	New Zealand dollar	1.0104

Question 9 (4 marks)

William and Kate have chosen some tiles for their new front porch (not including the steps).

    a. Use the scale shown to determine the length and width of the porch.

    b. Calculate the area of the porch.

Scale 1 : 100
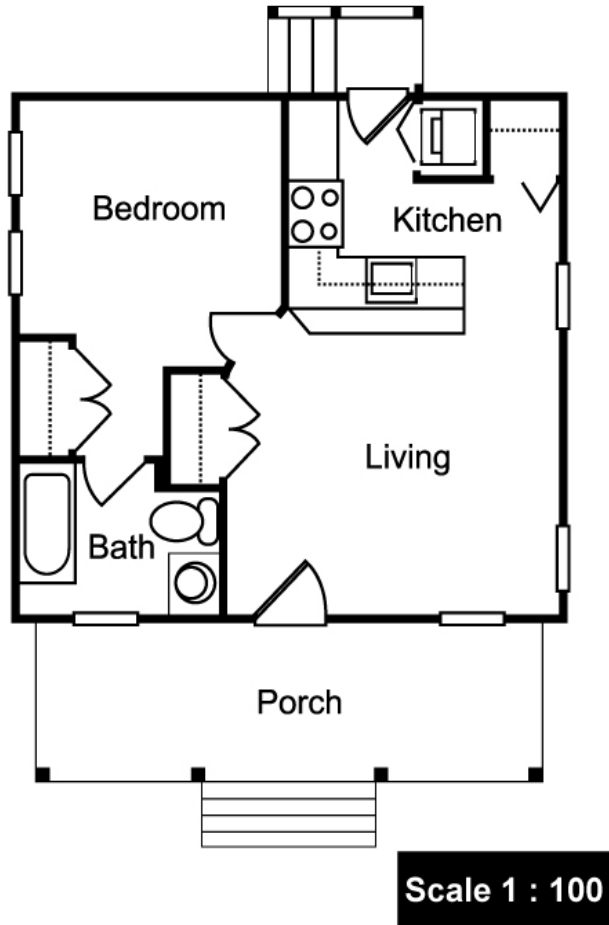
Question 10 (2 marks)

Complete the table to identify the gradients and y-intercepts of the equations.

Equation	Gradient	y-intercept
$y = 4x + 2$		
$y = -7x$		

Question 11 (5 marks)

Carrie is paid $19.50 per hour. She gets paid time-and-a-half for any hours worked over eight hours in a shift, and double time on weekends. She takes a half-hour, unpaid break each day she works for more than four hours. Calculate her weekly pay for the following timesheet.

Day	Start and finish times
Monday	8 am to 2 pm
Thursday	9 am to 4:30 pm
Saturday	9 am to 11 am

Question 12 (4 marks)

Using the simultaneous equations below, solve for x and y:

$y = x - 6$

$x = 4y$

Question 13 (6 marks)

Paul ordered seven lemonade ice-blocks and 12 chocolate-coated ice-creams, which would have cost him $38.60. However, he changed his order to eight chocolate-coated ice-creams and 11 lemonade ice-blocks, saving $4. Develop a mathematical model to calculate the individual price of a lemonade ice-block and a chocolate-coated ice-cream.

Evaluate the reasonableness of your solution.

Question 14 (3 marks)

Chipo buys 800 shares for $7.55 each. Six months later, she sells them for $9.56 each. The brokerage fee for buying and selling shares is 2.5%.
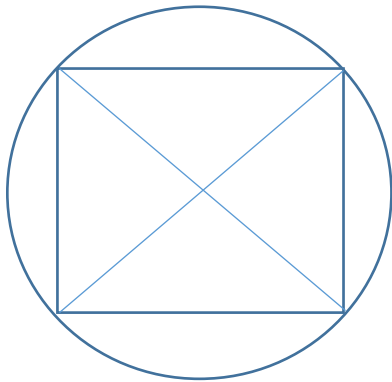
Calculate the percentage gain over the six-month period.

Question 15 (5 marks)

Calculate the surface area of a sphere with a volume of 110 mm^3.

Question 16 (5 marks)

Determine the perimeter of the square if the radius of the circle is 5 mm.

Question 17 (5 marks)

An artist has placed an order for concrete to make a solid cube with edge dimensions of 2.5 m, as part of a sculpture they are creating. They realise that they have only ordered enough concrete for a cube of half this edge length.

How much more concrete will they require to complete this project?

Justify your response using mathematical reasoning.

Question 18 (4 marks)

An electricity company charges 22.238 cents per kilowatt hour (kWh) and a fixed supply charge.
Emily's family used 901 kWh for a 92-day period. Their bill for this period was $526.02.
Determine the fixed supply charge.

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Extra working space

Extra working space

Examination marks summary

	Examination mark
Simple familiar (60%)	/ 42
Complex familiar (20%)	/ 14
Complex unfamiliar (20%)	/ 14
Total	**/ 70 =**