Raffles Girls' School
(SECONDARY)

Established in 1879

Name: _____

Class: 1 / _____ Register No: _____

MATHEMATICS
YEAR ONE

End-of-Year Assessment

Friday **8 October 2021** **2 hours**

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagram or graphs.
Do not use staples, paper clips, glue or correction tape.

Answer **all** the questions in the space provided.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an approved scientific calculator is expected, where appropriate.

Omission of essential working will result in a loss of marks.

You are reminded of the need for clear presentation in your answers.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is **80** and the weighting is **45%.**

Parent's / guardian's Name: _____

Signature: _____ Date: _____

For examiners' use	
Question	**Marks**
1	**/4**
2	**/2**
3	**/5**
4	**/3**
5	**/8**
6	**/6**
7	**/4**
8	**/4**
9	**/5**
10	**/4**
11	**/3**
12	**/8**
13	**/6**
14	**/8**
15	**/10**
PAU	
Total Marks	**80**

1 **(i)** Express the following numbers correct to 2 significant figures.

(a) 895.899 [1]

(b) 0.044772 [1]

(ii) Hence, without the use of a calculator, estimate the value of $\frac{895.899}{0.044772 \times 100}$, giving your answer correct to 1 significant figure. [2]

2 Solve the equation $x-8=2-3(4-5x)$. [2]

3 **(i)** Find the prime factors of 216 and 540, giving your answers in index form. [2]

(ii) Using the answers obtained in part **(i)**, state the following, leaving your answers in index form.

(a) highest common factor of 216 and 540, [1]

(b) lowest common multiple of 216 and 540. [1]

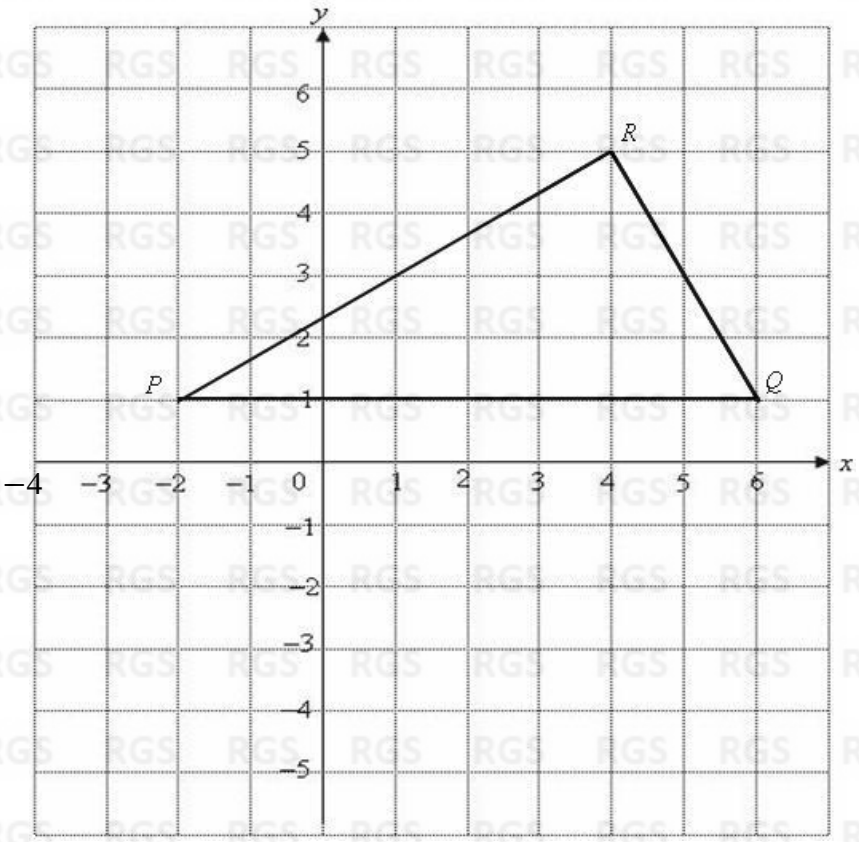
(iii) Write down the smallest positive integer value of q such that $\sqrt[3]{540q}$ is a whole number. [1]

4 The grid below shows triangle *PQR*.

(a) State the gradient of the line *PQ*. [1]

(b) Write down the coordinates of *S* such that *PQRS* is a parallelogram. [1]

(c) On the grid, draw and label the graph of $x = 5$. [1]



5 **(a)** Express $\frac{2}{3}-\frac{x-2}{6}-8x$ as a single fraction in its simplest form. [3]

(b) Expand and simplify $6\left[5(a+2b)-\frac{3}{2}(a+4b)\right]$. [3]

(c) Factorise $28hk+14h^2-4h(3-k)$, expressing your answer in its simplest form. [2]

6 A man drives a total distance of 176 km on a journey. He drives the first x km at an average speed of 96 km/h and the rest of the journey at an average speed of 80 km/h. The whole journey took 2 hours and 5 minutes.

(i) Write down an expression of the time taken, in terms of x, for the first part of the journey. [1]

(ii) Form an equation in terms of x and solve it. [4]

(iii) Find the time taken, in minutes, for the first part of the journey. [1]

7 Amy, Xinyee and Shruti invested \$50 000, \$37 500 and \$87 500 respectively in a start-up business.

(i) Express the ratio of Amy's share: Xinyee's share : Shruti's share in the simplest form. [1]

Three years later, they sold the business for \$345 000. They agreed to share the profit in the ratio of their investments.

(ii) How much profit did Amy receive? Leave your answer in dollars correct to the nearest cents. [3]

8 Solve the following pair of simultaneous equations. [4]

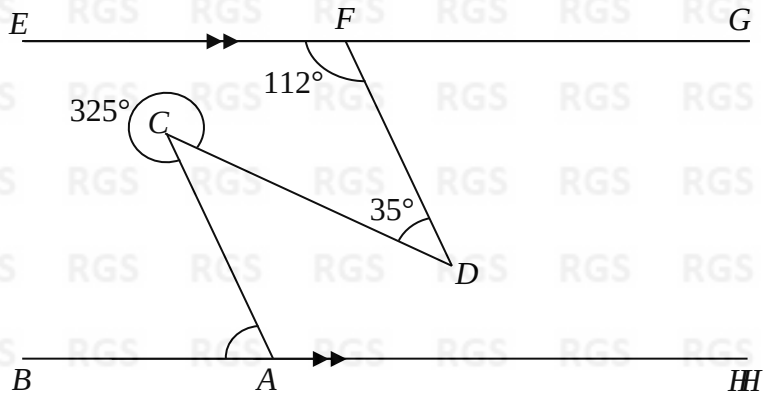
$$2x + 8y = 21$$

$$8(y + 3) = 4x - 9$$

9 **(a)** The cost of an air-ticket from Singapore to Sydney was increased from \$800 to \$1240. Calculate the percentage increase. [2]

(b) The number of flights from the airport decreased by 67% from 2019 to 2020. In 2020 there were 126 060 flights. Calculate the number of flights in 2019. [3]

10



In the figure above, EFG is parallel to BAH, $\angle FDC = 35°$, $\angle EFD = 112°$ and reflex $\angle ACD = 325°$.

(i) Is AC parallel to FD? Support your answer with reasons. [2]

(ii) Find $\angle BAC$, stating your reasons clearly. [2]

11 Three of the exterior angles of an n-sided polygon are 40° each, two of its interior angles are 86° and 115°, and the remaining interior angles are 153° each. Find the value of n. [3]

12 A car is priced at $105 600. Jessica intends to buy the car on hire purchase. She has to pay a 40% deposit. For the balance amount, she can take a 5-year loan from either Bank ABC or Finance Company XYZ.

(i) Write down the balance amount. [1]

(ii) If Jessica takes a loan from Bank ABC, she will be charged a simple interest of 3% per annum. Calculate

(a) the total amount she will have to pay for the car; [2]

(b) the amount of her monthly instalment. [2]

(iii) Finance Company XYZ charges an interest of 2.8% per annum, which is compounded annually. Would you advise Jessica to take the loan from Bank ABC or Finance Company XYZ? Support your answer with calculations. [3]

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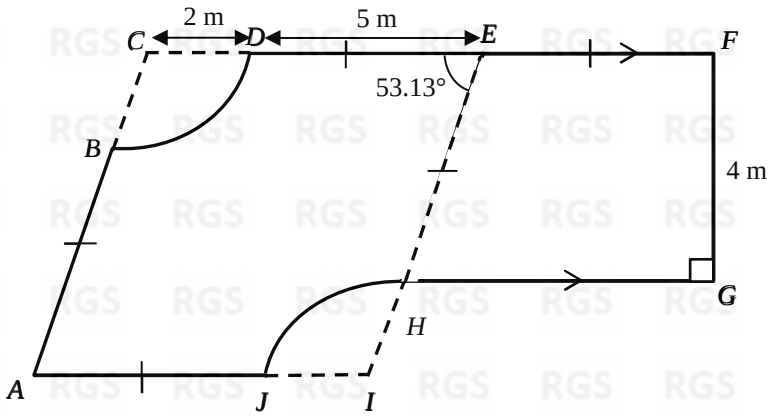
13 The figure below shows the design of a garden. The design is made up of a rhombus *ACEI*, with two sectors of radii 2 m removed, and a trapezium *EFGH* where *EF* is parallel to *HG* and *FG* is perpendicular to *HG*.



Given that $AB = DE = EH = AJ = EF = 5$ m, $FG = 4$ m and $\angle DEH = 53.13°$,

(i) Find the length of *HG*, given that the area of the trapezium *EFGH* is 26 m^2. [2]

(ii) Find the perimeter of the garden. [4]

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14 Figure 1 shows a prototype of a drain. It is formed by carving out a prism from a solid cuboid of dimensions 70 cm by 180 cm by 50 cm. The base of the discarded prism is an isosceles trapezium where $FE = CD = x$ cm and $ED = 40$ cm.

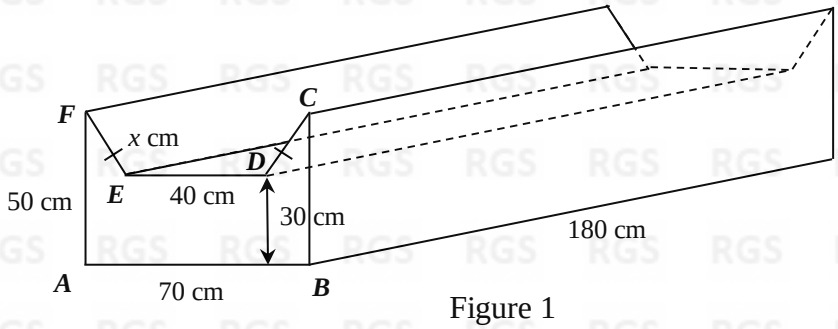

Figure 1

Figure 2 shows the cross section of the prototype, *ABCDEF*, where the parallel sides of the trapezium *FC* and *ED* are parallel to *AB*.
The perpendicular distance between *ED* and *AB* is 30 cm.

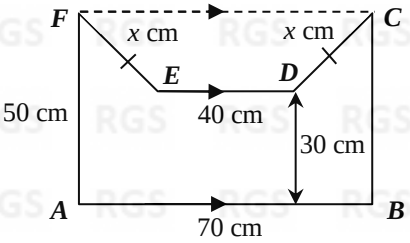

Figure 2

(i) Show that the area of *ABCDEF* is 2400 cm^2. [1]

(ii) Given that the total surface area of the prototype is 51 600 cm^2, form an equation in x and solve it. [2]

(iii) Find the volume of cement required to build the prototype, in cm^3. [2]

(iv) Calculate the cost of cement to build the prototype given that cement costs \$86.90 per m^3, correct your answer to 2 decimal places. [3]

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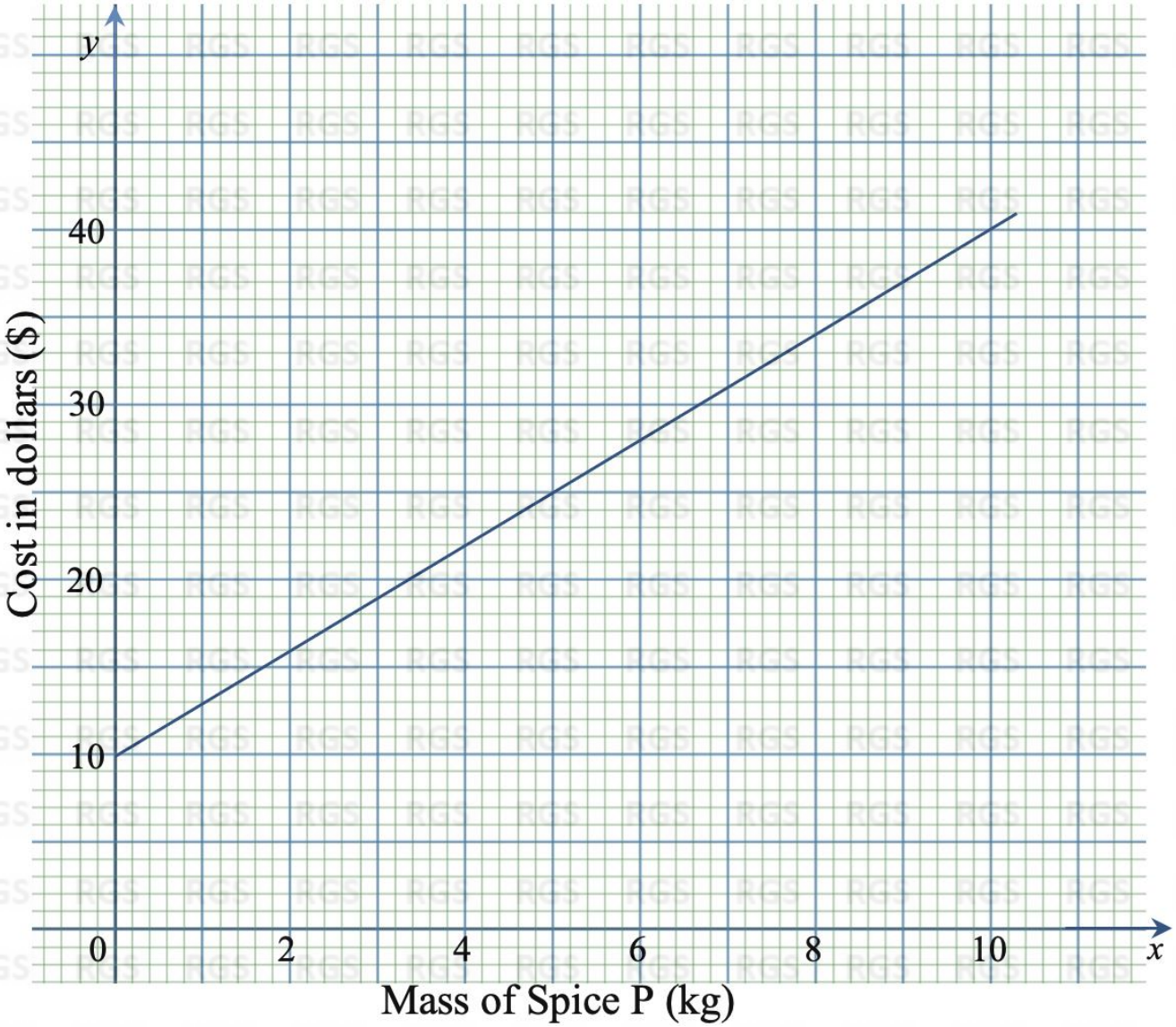
15 The manufacturing cost (\$$y$) of Spice **P**, by Company **S**, is modelled by the equation $y = ax + 10$, where x represents the mass of Spice **P** in kilograms. The graph is given below.



(i) Using the given graph,

(a) find the manufacturing cost of 5.5 kilograms of Spice **P**, [1]

(b) find the mass of Spice **P** given that the cost is \$34, [1]

(c) determine the value of a from the graph, [2]

(d) explain what a represents. [1]

(ii) The cost for Spice **P** by Company **T** is modelled by the equation $y = x + 20$.

(a) Complete the given table: [1]

x	0		10
y	20	27	

(b) On the given axes in **(i)**, plot the points in the table above and join them with a straight line. Label the equation of the line. [2]

(iii) **(a)** **Using the graphs**, write down the solution of the simultaneous equations:

$$y = ax + 10$$
$$y = x + 20$$

[1]

(b) Explain the significance of the point of intersection between the two graphs. [1]

------End of Paper-----

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