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SENG KANG SECONDARY SCHOOL 2025 END-OF-YEAR EXAMINATION

MATHEMATICS

SECONDARY 2 G3

Paper 2

06 October 2025

1 hour 15 minutes

READ THESE INSTRUCTIONS FIRST

Candidates answer on the Question Paper.
Write your index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use an HB pencil for any diagrams or graphs.
Do not use paper clips, highlighters, glue or correction fluid.

Answer all questions.

If working is needed for any questions, it must be shown with the answer.

Omission of essential working will result in loss of marks.

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

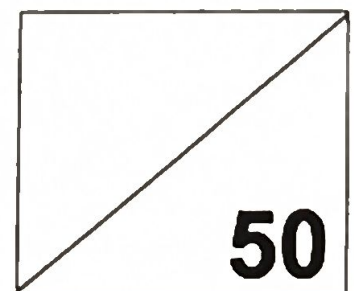
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

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

The total of the marks for this paper is 50.



Parent's / Guardian's Signature:

This document consists of 13 printed pages and 1 blank page.

[Turn Over

Mathematical Formulae**Compound interest**

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard Deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer all the questions.

- 1 A number sequence is given below as

248, 242, 236, 230, 224, ...

- (a) Find the next two terms in this sequence.

Answer [1]

- (b) Find, in terms of n , for the n th term of the sequence.
Leave your answer in its simplified form.

Answer [1]

- (c) Determine whether 16 is a term in the sequence? Explain your answer.

Answer

.....
.....
.....

[2]

- 2 (a) Expand and simplify $(x + 3)(x - 5)$.

Answer [1]

- (b) Factorise completely $24xy + 16yz - 18x - 12z$.

Answer [2]

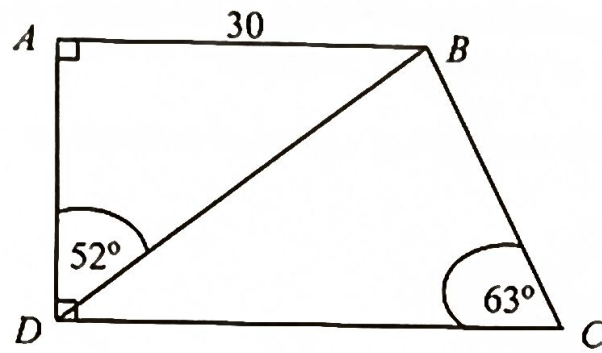
- (c) Simplify $\frac{15x^2y^4}{5z^3} \div \frac{20xy^2}{4yz^2}$.

Answer [2]

- (d) Simplify $\frac{2x+10}{x^2-5x-50}$.

Answer [2]

3



$ABCD$ is a shape in which $AB = 30$ cm, $\angle ADB = 52^\circ$, $\angle BCD = 63^\circ$.
Find

(a) the length of AD ,

Answercm [1]

(b) the length of CD ,

Answercm [2]

(c) the area of the $ABCD$.

Answercm² [2]

- 4 (a) An interior angle of a regular polygon is 5 times its exterior angle.
Find the number of sides of this regular polygon.

Answersides [2]

- (b) Four of the interior angles of a 7-sided polygon are 120° each, and the others are x° , $(x+15)^\circ$, $(x-30)^\circ$. Find the value of x .

Answer $x =$ [2]

- (c) Hence, find the largest angle in the polygon.

Answer $^\circ$ [1]

- 5 A bakery makes x chocolate cakes and y vanilla cakes.
The bakery makes 8 cakes in total.

(a) Write down an equation in x and y to represent this information.

Answer [1]

- (b) Each chocolate cake needs 400 g of flour and each vanilla cake needs 250 g of flour. A total of 2900 g of flour is used.
Write down an equation in x and y to represent this information and show that it simplifies to $8x + 5y = 58$.

Answer

[1]

- (c) Solve the simultaneous equations and find the number of each type of cake made.

Answerchocolate cakes

.....vanilla cakes [3]

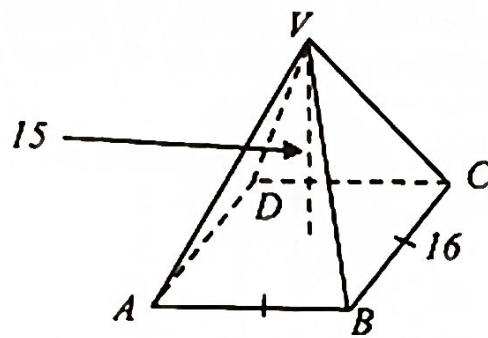
- (d) If the baker wants to use at most a total of 5 kg of flour to make an equal number of each type of cake, find the maximum number of each type of cake that can be made. Show your workings clearly.

Answer:

The baker can make a maximum of chocolate cakes and
vanilla cakes.

[2]

6



A solid consists of a pyramid of height 15 cm with a square base, $ABCD$, of sides 16 cm. Find

- (a) the slant height of the pyramid,

Answercm [2]

- (b) the total surface area of the pyramid.

Answercm² [3]

- (c) If the same amount of paint used to paint the pyramid is used to paint identical spheres of radius 2 cm instead, calculate the maximum number of complete spheres that can be painted.

Answerspheres [2]

- 7 The back-to-back stem-and-leaf diagram represents the masses, in grams, of apples harvested from two orchards, Orchard A and Orchard B.

Orchard A		Stem	Orchard B	
	5 3	8	4 7	
4	2 1	9	3 5 8	
	8 6	10	2 4 6	
	7 2	11	1 3	

Key: 8|4 represents 84 g

- (a) Which Orchard produced the heaviest apple?

Answer Orchard..... [1]

- (b) Find the percentage of apples which are heavier than 90 g but lighter than 105 g in both orchards.

Answer% [2]

- (c) On average, which Orchard produced heavier apples? Explain your answer.

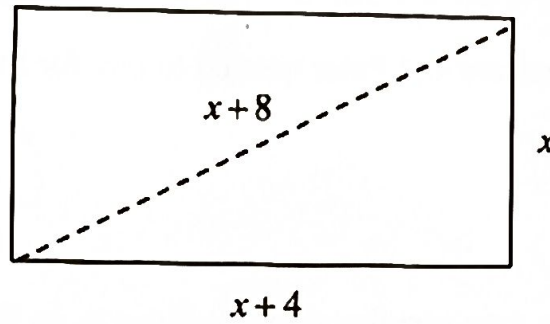
Answer

Orchard produced heavier apples because

.....

..... [2]

- 8 A rectangular garden has length $(x + 4)$ m and width (x) m. A diagonal fence (dotted line), built from one corner to the opposite corner of the garden, is $(x + 8)$ m long.



- (a) Write down a quadratic equation to represent this information and show that it reduces to $x^2 - 8x - 48 = 0$.

Answer

[2]

- (b) Solve the equation $x^2 - 8x - 48 = 0$.

Answer $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

- (c) Hence, find the perimeter of the garden.

Answer $\dots\dots\dots$ m [2]

- 9 Peter visits the GymSky Fitness Centre regularly.
In July, he purchased guest passes for 8 visits, with each guest pass costing \$12.50.

(a) Calculate the total amount Peter needed to pay for his guest visits in July.

Answer \$..... [1]

Peter wants a 12-month gym membership. He plans to go the gym at least 15 times every month. The table below shows four different membership plans. Each plan gives Peter a certain number of free gym visits per month. If Peter goes to the gym more than his free visits, he has to pay an extra \$12.50 for each additional visit. Peter also has to pay a one-time registration fee that depends on which plan he chooses, as shown in the table.

Plans	Free gym visits per month	Monthly fee	One-time registration fee
Basic	12	\$88	\$150
Premium	Unlimited	\$128	Free
Standard	16	\$98	\$120
Plus	20	\$108	\$100

- (b) Which plan should Peter sign up to get the cheapest deal?
Show your working clearly.

Answer

Peter should get theplan because it is the cheapest deal.

[3]

END OF PAPER

Sec 2 G3 EOY P2 2025

1a	218, 212	4b	Sum all int angle = $(7 - 2) \times 180 = 900$
1b	$T_n = 254 - 6n$		$x + x + 15 + x - 30 + 4 \times 120 = 900$ $3x + 465 = 900$ $x = 145$
1c	$16 = 254 - 6n$ $6n = 238$ $N = 39.7$	4c	160
	Since n is not a positive integer, 16 does not belong to this sequence. Accept whole number/not an integer etc	5a	$x + y = 8$ -----(1)
2a	$x^2 - 5x + 3x - 15 = x^2 - 2x - 15$	5b	$400x + 250y = 2900$ $8x + 5y = 58$ -----(2)
2b	$8y(3x + 2z) - 6(3x + 2z)$ $= (3x + 2z)(8y - 6) = 2(3x + 2z)(4y - 3)$	5c	From (1) $\times 8$: $8x + 8y = 64$ -----(3) $(3) - (2) : 3y = 6$ $Y = 2, X = 6$ 6 chocolate, 2 vanilla cakes
2c	$\frac{15x^2y^4}{5z^3} \times \frac{4yz^2}{20xy^2}$ $\frac{3xy^3}{5z}$	5d	$400 + 250 = 650$ $5000 \div 650 = 7.6$ Max 7 chocolate cakes and 7 vanilla cakes
2d	$\frac{2(x+5)}{(x-10)(x+5)}$ $\frac{2}{x-10}$	6a	$15^2 + 8^2 = x^2$ $x = \sqrt{289} = 17$
3a	$\tan 52 = \frac{30}{AD}$ $1.2799 = \frac{30}{AD}$ $AD = 23.4385 = 23.4$	6b	Area 1 triangle = $\frac{1}{2} \times 16 \times 17 = 136$
3b	$\tan 63 = \frac{BX}{CX}$ $1.9626 = \frac{23.4385}{CX}$ $CX = 11.9425$ $CD = 30 + 11.9425 = 41.9425 = 41.9$		Base area = $16 \times 16 = 256$ Total surface area = $4 \times 136 + 16^2 = 800$
3c	$\frac{1}{2} \times 23.4385 \times (30 + 41.9425)$ $842.869 = 843$	6c	Surface area 1 sphere = $4 \times \pi \times 2^2 = 50.265$ Number of sphere = $800 + 50.265 = 15.915 = 15$
4a	Interior angle + exterior angle = 180 $5x + x = 180$ $X = 30$ Number sides = $360/30 = 12$		

7a	Orchard A	9a	$12.5 \times 8 = \$100$
7b	8 apples are in the range $\frac{8}{19} \times 100 = 42.1\%$	9b	For Basic plan, Extra visits needed: $15 - 12 = 3$ visits per month Extra cost per month: $3 \times \$12.50 = \37.50 Total monthly cost: $\$88 + \$37.50 = \$125.50$ Total cost for 12 months: $(\$125.50 \times 12) + \$150 = \$1,506 + \$150 = \$1,656$
7c	Mean mass of A = $888/9 = 98.6667\text{g}$ Mean mass of B = $993/10 = 99.3\text{g}$ Orchard B produced heavier apples because the mean mass of Orchard B is heavier/higher		For Premium plan, Total monthly cost: \$128 Total cost for 12 months: $\$128 \times 12 = \$1,536$
8a	$x^2 + (x+4)^2 = (x+8)^2$		For Standard plan , Extra visits needed: $15 - 16 = 0$ visits per month (no extra needed) Extra cost per month: \$0 Total monthly cost: \$98 Total cost for 12 months: $(\$98 \times 12) + \$120 = \$1,176 + \$120 = \$1,296$
	$x^2 + x^2 + 8x + 16 = x^2 + 16x + 64$ $x^2 - 8x - 48 = 0$		For Plus plan, Extra visits needed: $15 - 20 = 0$ visits per month (no extra needed) Extra cost per month: \$0 Total monthly cost: \$108 Total cost for 12 months: $(\$108 \times 12) + \$100 = \$1,296 + \$100 = \$1,396$
8b	$(x-12)(x+4) = 0$		Based on the calculation, he should choose the Standard Plan
	$x = 12$ or $x = -4$		
8c	Perimeter = $12 + (12+4) + 12 + (12+8)$		
	=56		