CANDIDATE NAME		(	)	CLASS	

Anglo-Chinese School
(Barker Road)

THE BEST IS YET TO BE

END-OF-YEAR EXAMINATION 2021

SECONDARY ONE
EXPRESS

MATHEMATICS
PAPER 1

1 HOUR 15 MINUTES

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Answer **all** questions.
If working is needed for any question 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 your 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 examinations, fasten 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.

For Examiner's Use

This document consists of **10** printed pages.

Answer **all** the questions.

1 **(a)** Calculate $\dfrac{\sqrt[3]{3.41}}{18.5 - 2.81^2}$.

Write down the first 5 digits on your calculator display.

Answer _____ [1]

(b) Write your answer to part (a) correct to 3 decimal places.

Answer _____ [1]

2 By rounding each number to 1 significant figure, estimate the value of

$$\frac{62.89 \times 8.93}{3.12} .$$

You must show your working.

Answer _____ [2]

3 Simplify $4y - (13y - 5x)$.

Answer _____ [2]

4 Factorise completely $7a - 21ay$.

Answer _____ [2]

5 Write these numbers in order of size, starting with the smallest.

$$\frac{3}{5} \qquad 0.75\% \qquad \frac{\sqrt{3}}{2} \qquad \frac{\pi}{4} \qquad 0.57$$

Answer _____ , _____ , _____ , _____ , _____ [2]

smallest   largest

6
$$1 \qquad 5 \qquad \pi \qquad \frac{22}{7} \qquad 2$$
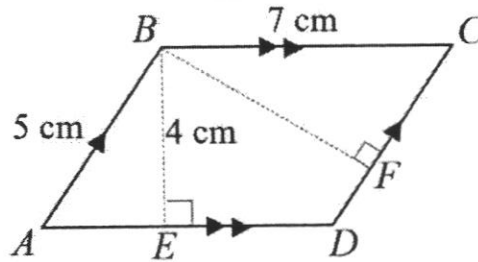
List down
(a) all the prime numbers,

Answer _____ [1]

(b) all the rational numbers.

Answer _____ [1]

---

7 In the diagram, $AB = 5$ cm , $BC = 7$ cm, $BE = 4$ cm.

BE is perpendicular to AD and BF is perpendicular to DC.

Find BF.

Answer _____ cm [2]

8 Express $\dfrac{5x}{3} - \dfrac{2x+y}{4}$ as a single fraction in its simplest form.

Answer _____ [3]

9 The price of a house at the end of 2019 was 9% **higher** than at the end of 2018.
The price of the house at the end of 2020 was 9% **lower** than at the end of 2019.

Jim says that the price of the house at the end of 2020 will be the same as that in 2018.
Is he correct? Show your working to support your answer

Answer

[3]

10 (a) Convert 72 km/h to m/s.

Answer _____ m/s [2]

(b) 50 g of meat costs x dollars.
Find an expression, in dollars, for the cost of y kg of meat.

Answer $ _____ [2]

11 Amy and Ben each have a savings account.
The ratio of Amy's savings : Ben's savings = 7 : 9

They each spend $50 from their savings.
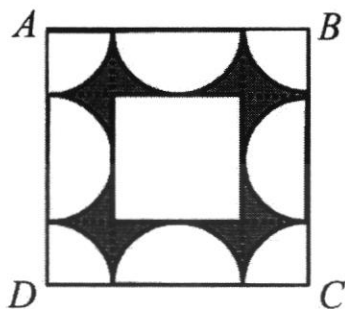The new ratio of Amy's savings : Ben's savings = 3 : 4

Find how much money they have in total at the beginning.

Answer $ _____ [4]

12   The figure below shows a large square *ABCD* and a small square in the centre.
      There are 4 semi-circles and 4 quadrants each with a radius of 7 cm.

      Find the area of the shaded part as a percentage of the unshaded part.

      (Use $\pi = \dfrac{22}{7}$)

Answer _____% [4]

13 **(a)** $r = -q^2 \left(\dfrac{1}{4} - p \right)$.
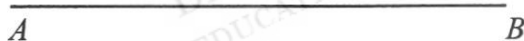
Find the value of r when $q = -2$ and $p = 3$.

Answer _____ [1]

(b) I am thinking of a number n.
32 divided by the sum of n and 3 gives me 8.
What is the number?

Answer _____ [3]

14 **(a)** Construct quadrilateral *ABCD* such that *BC* = 7 cm, *AD* = 6 cm, angle *ABC* = 80° and angle *BAD* = 100°.
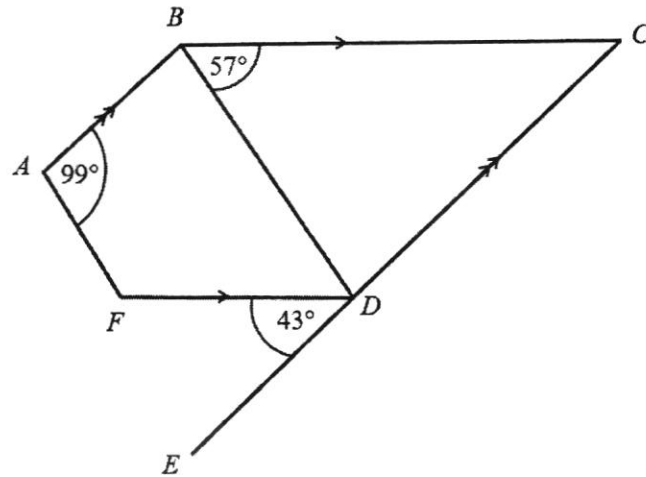*AB* has already been drawn below.

Answer

A _____ B

[2]

(b) Measure and write down the length of the diagonal *BD*.

Answer _____ cm [1]

(c) Measure and write down the size of angle *ADC*.

Answer _____ ° [1]

15

In the diagram, AB is parallel to EDC and BC is parallel to FD.
Angle $CBD = 57°$, angle $EDF = 43°$ and angle $FAB = 99°$.

(a) Complete these statements by calculating the size of each angle.
Give a reason for each statement.

Statement   Reason

Angle $BCD =$ _____ ° _____ [1]

Angle $BDF =$ _____ ° _____ [1]

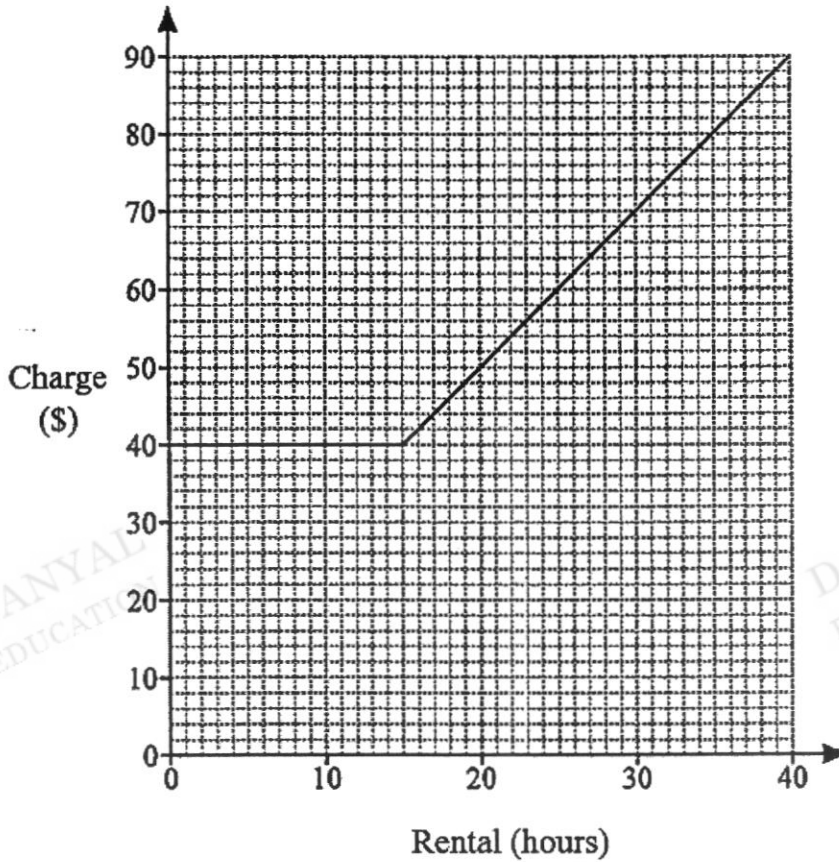**(b)** Calculate angle AFD.

Answer _____ ° [2]

(c) John says that AF is parallel to BD. Do you agree or disagree?
You must show your calculations.

Answer

_____ because _____

_____ [1]

16

Rental (hours)

The graph shows the charge imposed by a company for the rental of an electric bike.
The charge depends on the number of hours of rental.

(a) How much does the company charge for rental of an electric bike for 35 hours?

Answer $ _____ [1]

(b) Complete these sentences.

The company charges a fixed cost of $ _____ for rental of an electric

bike up to _____ hours.

Each additional hour costs $ _____.   [2]

(c) Another company charges a rate of $4 per hour, without any fixed cost.
Draw on the same grid the graph representing this company's charging model.   [1]

(d) Complete the sentence.

Both companies charge the same amount to rent an electric bike for

_____ hours.   [1]

| CANDIDATE NAME | | ( ) | CLASS | |

END-OF-YEAR EXAMINATION 2021

SECONDARY ONE
EXPRESS

MATHEMATICS
PAPER 2

1 HOUR 15 MINUTES

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| For Examiner's Use |
| |

This document consists of **14** printed pages.

Answer **all** the questions.

1 Expressed as a product of its prime factors, $156 = 2^2 \times 3 \times 13$.

(a) Express 90 as a product of its prime factors.

Answer _____ [1]

(b) Find the lowest common multiple of 90 and 156.

Answer _____ [1]

(c) The number $\dfrac{156}{k}$ is a perfect square. Find k.

Answer $k =$ _____ [1]

(d) The highest common factor of 156 and x is 26.
x is between 100 and 200.
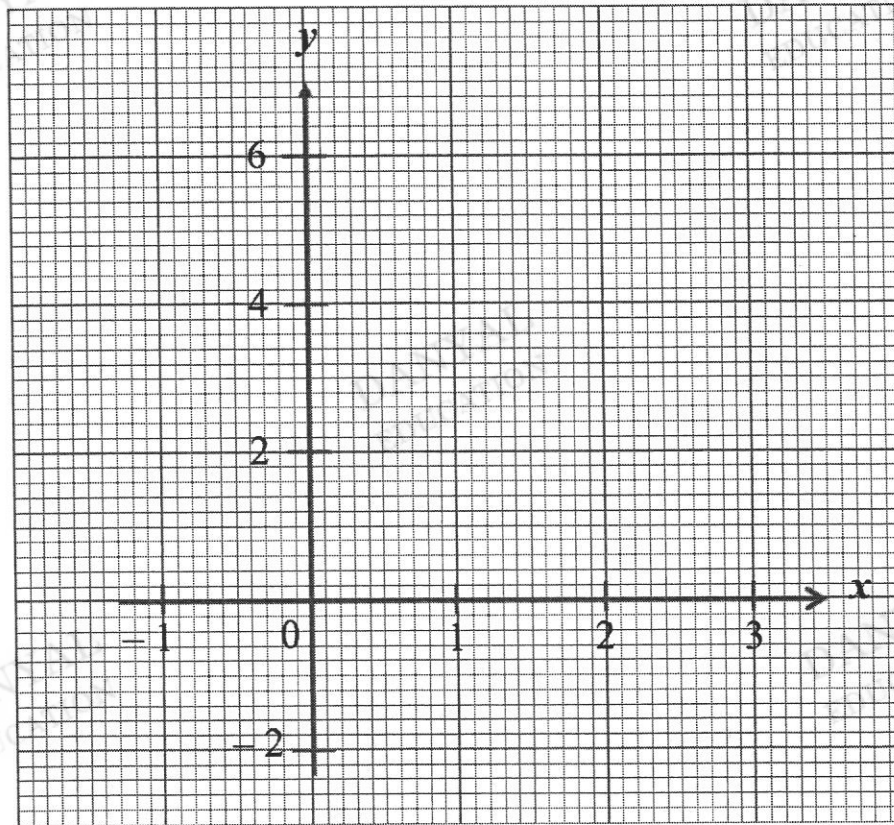Find the smallest possible value of x.

Answer $x =$ _____ [2]

2 The variables x and y are connected by the equation $y + 2x = 4$.
The table shows some corresponding values of x and y.

x	-1	1	3
y	6	p	-2

(a) Find the value of p.

Answer $p =$ _____ [1]

(b) On the axes below, draw the graph of $y + 2x = 4$ for values of x from -1 to 3.
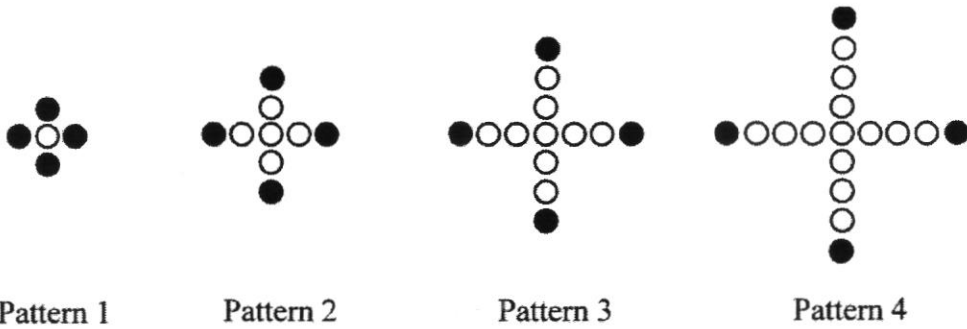

[2]

(c) From your graph,
   (i) write down the coordinates of the point where the line meets the x-axis,

Answer (_____ , _____) [1]

   (ii) find the value of x when $y = -1$.

Answer $x =$ _____ [1]

3 The diagram below shows a series of patterns made using shaded and unshaded circles.

| Pattern 1 | Pattern 2 | Pattern 3 | Pattern 4 |

(a) Complete the table.

Pattern	Number of circles	Number of unshaded circles
1	$1 + 4 = 5$	1
2	$1 + 4 + 4 = 9$	5
3	$1 + 4 + 4 + 4 = 13$	9
4	$1 + 4 + 4 + 4 + 4 = 17$	13
5		

[1]

(b) Write down an expression, in terms of n, for the number of circles in Pattern n.

Answer _____ [1]

(c) Explain why the number of circles in the sequence is always odd.
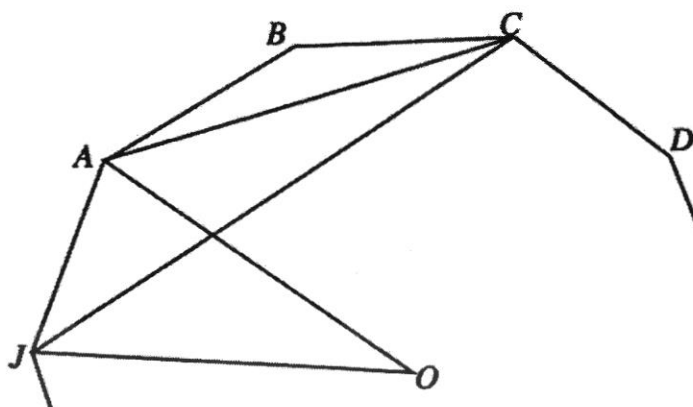
Answer _____

_____

_____ [1]

(d) Would there be a pattern where there are 178 unshaded circles?
Show your working clearly.

Answer _____ [2]

4   *JABCD* shows part of a regular ten-sided polygon.
    O is the centre of the polygon.

(a)   Find

   (i)   angle *ABC*,

                                    Answer _____ °   [2]

   (ii)   angle *AOJ*,

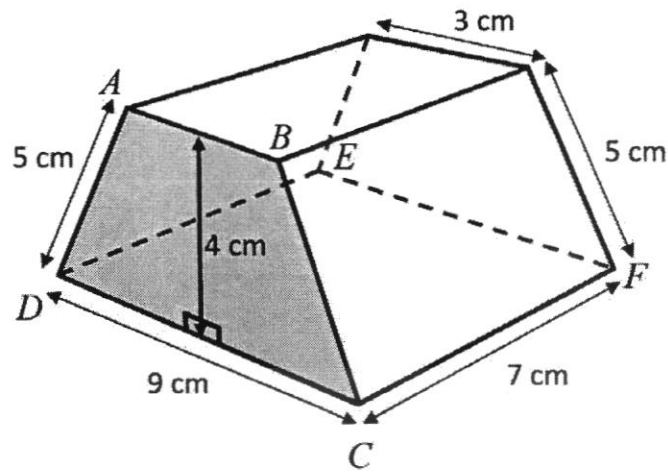   *Answer* _____ °   [1]

   (iii)   angle *CAJ*.

                                    Answer _____ °   [2]

5   The figure shows a solid prism with a uniform cross-section *ABCD* in the shape of a trapezium.

(a)   Show that the area of the cross-section *ABCD* is 24 cm².

Answer

[1]

(b)   Calculate the volume of the prism.

Answer _____ cm³   [1]
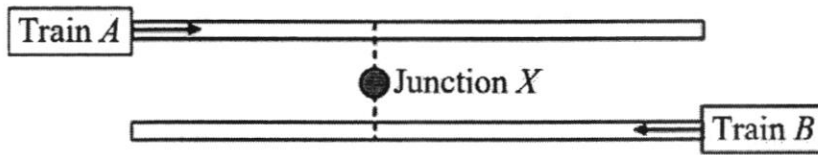
(c) Calculate the total surface area of the prism.

Answer _____ cm² [3]

6 Two trains, A and B, left their respective stations and travelled at a constant speed in opposite directions, on parallel tracks.

Train A travelled at 70 km/h while Train B travelled at 85 km/h.

At a certain point in time, both trains pass each other at Junction X.

(a) Train A had travelled x km when it reached Junction X. Write down, in terms of x, the time taken for Train A to travel from its station to Junction X.

Answer _____ hours   [1]

(b) Train B had travelled 45 km more than Train A when it reached Junction X. Write down, in terms of x, the time taken for Train B to travel from its station to Junction X.

Answer _____ hours   [1]

(c) Hence or otherwise, form an equation in x and solve it.

Answer

[3]

(d) Find the distance between the two stations.

Answer _____ km   [1]

7 (a) The following table shows various foreign exchange rates, against the Singapore Dollar (SGD).

Code	Currency	Unit	SGD
USD	US Dollar	1	1.3409
AUD	Australian Dollar	1	0.9848
JPY	Japanese Yen	100	1.2175
HKD	Hong Kong Dollar	100	17.1850

For example,
1 US Dollar = 1.3409 Singapore Dollars (SGD) and
100 Japanese Yen = 1.2175 Singapore Dollars.

(i) Jenny bought a handbag in Hong Kong for HKD 350.
Calculate the cost in SGD.

Answer SGD _____ [2]

(ii) A tourist from Australia bought a bag for SGD $294.35.
The amount paid included a commission of 1.5% because the tourist paid in AUD.

What was the price of the bag in AUD, excluding the commission, correct to the nearest dollar?
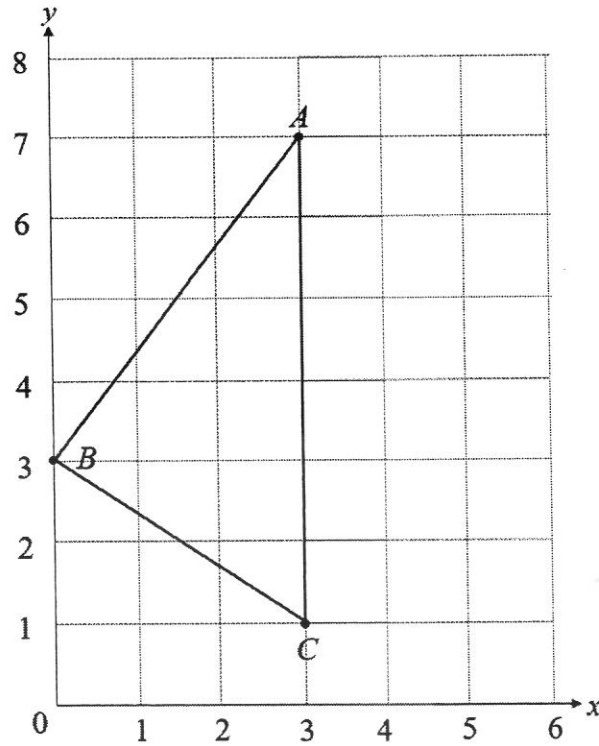
Answer AUD _____ [2]

(b) Jim puts a certain amount of money into a savings account paying simple interest of 2% per annum.
At the end of 2 years, the total amount of money in his account is $3120.

Find the amount of money that Jim put into the account.

Answer $ _____ [2]

8

The diagram shows a triangle *ABC*.
A, *B* and *C* are the points (3, 7), (0, 3) and (3, 1) respectively.

(a) The quadrilateral *ABCD* is symmetrical about the line *AC*.
  (i) Write down the coordinates of point *D*.

Answer (_____ , _____) [1]

  (ii) Find the area of the quadrilateral *ABCD*.

Answer _____ unit² [2]

(iii) What is the special name given to this quadrilateral?

Answer _____ [1]

(b) **(i)** Find the gradient of the line *AB*.

Answer _____ [1]

(ii) Write down the equation of the line *AB*.

Answer _____ [2]

9 Jeremy owns a car of engine capacity of 1599 cc.
He drives on average about 11 000 km per year in his car.
His car travels 11 km on every litre of petrol.

The cost of petrol can be estimated based on the following:

Engine Capacity (cc)	Cost of petrol per litre
< 1000	$2.47
$1000 \leq cc < 1600$	$2.49
≥ 1600	$2.58

(a) Calculate the amount that Jeremy pays for petrol in a year.

Answer $ _____ [2]

(b) In addition to petrol, Jeremy estimates that he will have to pay for the following extra costs **each year**:

• Car Insurance	$1650 (Before NCD*)
• Electronic Road Pricing (ERP)	$920
• Servicing and other maintenance + Road Tax	$2000
• Parking	$2640

*NCD: No-claim discount. Jeremy enjoys a 40% discount on car insurance because he has not made any claim.

Jeremy estimates that, if he did not have a car, he would incur **all** of the following **monthly** travel costs from taking public transport.

• MRT	$50
• Bus	$55
• Taxis	$375

Would it be cheaper for Jeremy to use other transport instead of his car?
Show working to support your answer.

[4]

Marking Scheme
Secondary 1 Express
Mathematics Paper 1
End of Examination 2021

Anglo-Chinese School
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1	(a)	0.1419			
	(b)	0.142			
2		$\dfrac{60\times 9}{3}$ 180			
3		$5x-9y$			
4		$7a(1-3y)$			
5		$0.75\%\,,\,0.57\,,\,\dfrac{3}{5}\,,\,\dfrac{\pi}{4}\,,\,\dfrac{\sqrt{3}}{2}$			
6	(a)	2, 5			
	(b)	$1, 2, 5, \dfrac{22}{7}$			
7		Area = 7 x 4 = 28 cm^2 $BF = \dfrac{28}{5} = 5.6\,\text{cm}$			
8					

Marking Scheme
Secondary 1 Express
Mathematics Paper 1
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9		Let x be the price in 2018 Price in 2019 = 1.09x Price in 2020 = 0.91(1.09)x = 0.9919x Jim is wrong.			
10	(a)	$\dfrac{72 \times 1000}{60 \times 60}$ = 20 m/s			
	(b)	50 g = 0.05 kg 0.05 kg costs \$$x$. y kg costs \$ $\dfrac{yx}{0.05}$ = \$20xy			
11		Original 7:9 New ratio 3:4 6:8 Since both have spent one part/unit from original, => 1 part/unit = \$50 Total = 7+9 = 16 units Total amount at beginning = 16 x \$50 = \$800			
12		Area of WXYZ = 28 x 28 = 784 cm^2 Area of small square = 14 x14 =196 cm^2 (4 quarter circles and 4 semi-circles form 3 circles) Area of the circles = 3 x $\dfrac{22}{7}$ x 7 x 7 = 462 cm^2 Area of the shaded part = 784 − 196 − 462 = 126 cm^2 Percentage of shaded part to unshaded part = $\dfrac{126}{784-126} \times 100\%$ = $19\dfrac{7}{47}\%$			
13	(a)	11			
	(b)	Let the number be n. $\dfrac{32}{n+3} = 8$ $32 = 8n + 24$ $n = 1$			

Marking Scheme
Secondary 1 Express
Mathematics Paper 1
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Anglo-Chinese School
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14		Construction (refer behind) 90°±3° 9.6 cm ± 0.2cm		
15	(a)	Angle BCD = 43° (corresponding angles, $BC//FD$) Angle BDF = 57° (alternate angles, $BC//FD$) Or Angle BDC = (180 – 43 – 57) = 80° Angle BDF = (180 – 80 – 43) = 57° (adjacent angles on a straight line)		
	(b)	angle ABD = 180 – (43 + 57) = 80° angle AFD = 360 – 99 – 57 – 80 = 124°		
	(b)	Disagree **because** angle FAB + angle ABD is not equal to 180° (converse, interior opposite angles)		
16	(a)	$80		
	(b)	$40, 15 hours $2		
	(c)			
	(d)	10 hours		

Marking Scheme
Secondary 1 Express
Mathematics Paper 2
End-of-Year Examination 2021

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1	(a)		$90 = 2 \times 3^2 \times 5$			
			$156 = 2^2 \times 3 \times 13$			
	(b)		LCM = 2340			
	(c)		$\dfrac{2^2 \times 3 \times 13}{3 \times 13} = 2^2$ $k = 3 \times 13 = 39$			
	(d)		$156 = 2^2 \times 3 \times 13$ $26 = 2 \times 13$ $x = 2 \times 13 \times 5 = 130$			
2	(a)		2			
	(b)					
	(c)		(2, 0)			
	(d)		$x = 2.5$			

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Marking Scheme
Secondary 1 Express
Mathematics Paper 2
End-of-Year Examination 2021

3	(a)		Number of circles: $1 + 4 + 4 + 4 + 4 + 4 = 21$ Number of unshaded circles: 17			
	(b)		$1 + 4n$			
	(c)		For any value of n, $4n$ will always be even. Adding and even number to 1 will always give an odd number. Hence the number of circles in the sequence will always be odd.			
	(d)		$(1 + 4n) - 4 = 178$ $4n = 181$ $n = 45.25$ No, there will not be a pattern.			
4	(a)		$\dfrac{(10 - 2) \times 180}{10}$ $144°$			
	(b)		$\dfrac{360}{10} = 36°$			
	(c)		angle $BAC = \dfrac{180 - 144}{2} = 18°$			
			angle $CAJ = 144 - 18 = 126°$			
5	(a)		$\dfrac{1}{2}(3 + 9)(4) = 24 \text{ cm}^2$			
	(b)		$24 \times 7 = 168$			
	(c)		$5 \times 7 \times 2 = 70 \text{ cm}^2$			
			$(3 \times 7) + (9 \times 7) = 84 \text{ cm}^2$			
			Total surface area $= (24 \times 2) + 84 + 70 = 202 \text{ cm}^2$			
			Or			
			$(3 + 5 + 9 + 5) \times 7 = 154 \text{ cm}^2$			
			$24 \times 2 = 48 \text{ cm}^2$			
			Total surface area $= 154 + 48 = 202 \text{ cm}^2$			

Marking Scheme
Secondary 1 Express
Mathematics Paper 2
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6	(a)	(i)	$\dfrac{x}{70}$			
	(b)	(ii)	$\dfrac{x+45}{85}$			
	(c)		$\dfrac{x}{70}=\dfrac{x+45}{85}$ $85x=70x+3150$ $15x=3150$ $x=210$			
	(d)		Total distance travelled $= 210 + (210 +45) = 465$ km			
7	(a)	(i)	HKD $1 = \dfrac{1}{100}\times17.1850 =$ SGD 0.171850 HKD $350 =$ SGD $(350 \times 0.171850) =$ SGD 60.15			

		(ii)	Method 1 Cost of bag in SGD $= 294.35\times\dfrac{100}{101.5}$		Method 2 Total amount paid in AUD $=$ $294.35 \div 0.9848$ $= 298.89$	M1
			$=$ SGD 290		Cost in AUD $= 298.89\times\dfrac{100}{101.5}$	M1
			Cost in AUD $=$ $290 \div 0.9848 = 294.48$ $= 294$		$=294.47$ $=294$	A1
	(b)		$3120 = P+\dfrac{P(2)(2)}{100}$ $312000 = 100P + 4P$ $P = 312000 \div 104 = \$3000$			

Marking Scheme
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Mathematics Paper 2
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8	(a)	(i)	(6, 3)			
		(ii)	$\left(\dfrac{1}{2} \times 6 \times 3\right) = 9$ $9 \times 2 = 18$			
		(iii)	Kite			
	(b)	(i)	Gradient $= \dfrac{4}{3}$			
		(ii)	$y = \dfrac{4}{3}x + 3$			
9	(a)					
	(b)					