Class:	Candidate Name:	Candidate Index Number:

SHUQUN SECONDARY SCHOOL
2017 End-of-Year Examination
Secondary 1 Express

MATHEMATICS

Paper 1 — 05 October 2017

Candidates answer on the Question Paper — **1 hour 30 minutes**

INSTRUCTIONS TO CANDIDATES

Write your name, class and class index number in the spaces at the top of this page and all the work you hand in.
Write in blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips highlighters, 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.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

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 number of marks for this paper is **50**.

This question paper consists of **12** printed pages.

[Turn over]

Answer **all** questions.

1. A wooden block has a mass of 165 grams, correct to the nearest gram.
Find the least possible mass of the wooden block.

Answer: _____ g [1]

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2. Write the following in order of size, starting with the smallest.

$$83\%, \quad -0.8, \quad \frac{4}{5}, \quad 0.8\dot{3}, \quad 0.\dot{8}\dot{3}$$

Answer: _____ *smallest* , _____ , _____ , _____ , _____ *largest* [1]

---

3. Given that $2k < 20$, write down

(a) the largest integer value of k,

Answer: _____ [1]

(b) the largest prime value of k.

Answer: _____ [1]

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4. Here is a recipe for a chocolate dessert.

Serves 4 people	
100 g	Flour
75 g	Plain Chocolate
50 g	Butter
300 ml	Milk
65 g	Sugar
5 ml	Vanilla Essence
2	Eggs

(a) Fiona is making the dessert for 14 people.
How many grams of butter does she need?

Answer: _____ g [1]

(b) Michael uses the same recipe with 1.5 litres of milk.
For how many people is he making the chocolate dessert?

Answer: _____ people [1]

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5. Write down the next term for each sequence.

(a) 14, 10, 6, 2, _____

Answer: _____ [1]

(b) 1, 4, 9, 16, _____

Answer: _____ [1]

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6. The temperature of a city at 09 00 is $-6°C$.
The temperature at 14 00 is 14°C.

(a) Calculate the temperature difference of the city between 09 00 and 14 00.

Answer: _____ °C [1]

(b) Assuming that the temperature rises at a steady rate, find the temperature at 11 00.

Answer: _____ °C [2]

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7. An athlete runs 10 000 metres in 40 minutes.
Calculate his average speed in kilometres per hour.

Answer: _____ km/h [3]

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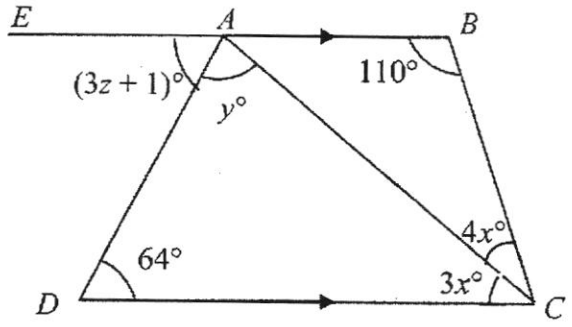
8. **(a)** Express 360 as a product of its prime factors, giving your answer in index notation.

Answer: _____ [2]

(b) Hence, find the smallest positive integer z such that $360z$ is a cube number.

Answer: $z =$ _____ [1]

9. In the figure below, EAB is parallel to DC.
$\angle EAD = (3z+1)°$, $\angle ADC = 64°$, $\angle DAC = y°$, $\angle ACD = 3x°$, $\angle ACB = 4x°$ and $\angle ABC = 110°$.



(a) Find the value of x.

Answer: $x =$ _____ [1]

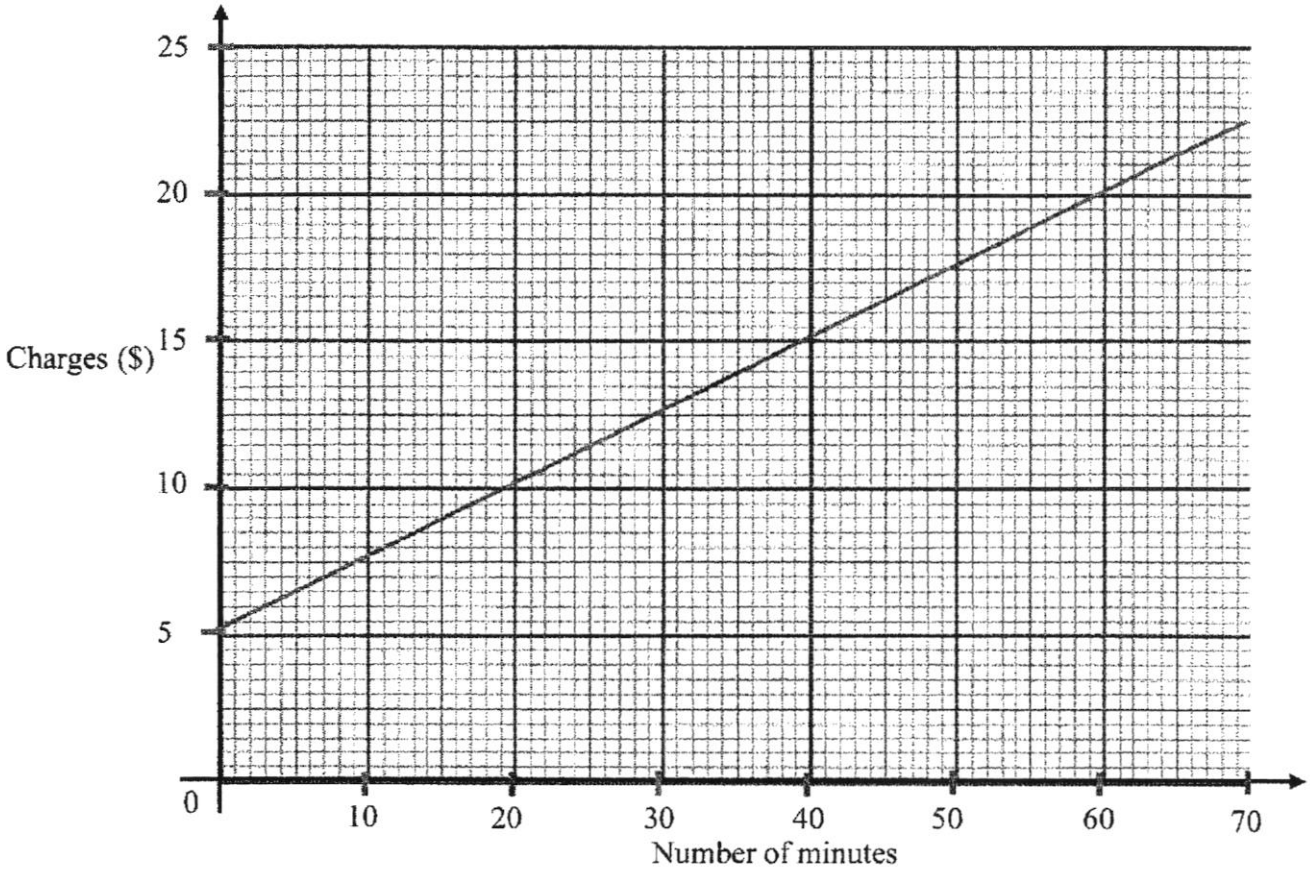
(b) Find the value of y.

Answer: $y =$ _____ [1]

(c) Find the value of z.

Answer: $z =$ _____ [1]

10. A telephone company charges customers for the number of minutes they called every month.
There is a fixed charge and a charge for each minute of calls made.



(a) Find the fixed charge.

Answer: $ _____ [1]

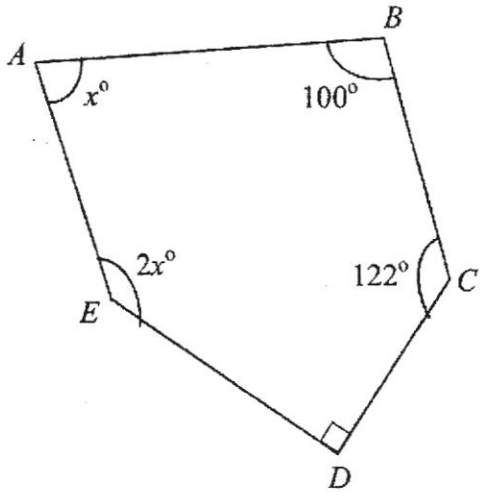
(b) On a particular month, Kamallesh's bill was $15.
How many minutes did he call on his mobile phone?

Answer: _____ min [1]

(c) Yesha used 1 hour and 4 minutes for a particular month.
Find the amount that she has to pay.

Answer: $ _____ [1]

11. (a) The diagram shows a pentagon $ABCDE$. Calculate the value of x.



Answer: $x =$ _____ [3]

(b) Calculate the number of sides of a regular polygon if each of its exterior angle is 30°.

Answer: _____ sides [1]

12. **(a)** Simplify the ratio 1.6 kg : 400 g.

Answer: _____ [1]

(b) If $p:q=\frac{3}{4}:2$ and $p:r=\frac{1}{3}:\frac{1}{2}$, find $q:r$.

Answer: _____ [3]

---

13. **(a)** By rounding each number to 1 significant figure, **estimate** the value of

$$29.83-3.05\times 7.8.$$

Show your working.

Answer: _____ [2]

(b) Estimate the value of $\sqrt{50}\times\sqrt[3]{25}$.

Answer: _____ [2]

---

14. **(a)** Express $\frac{2}{5}$% as a fraction in the simplest form.

Answer: _____ [1]

(b) Express \$3 as a percentage of 15¢.

Answer: _____ % [1]

(c) Chris bought a bicycle in 2016. One year later, he sold it at a loss of 30% at \$581. Calculate the price he paid for the bicycle in 2016.

Answer: \$ _____ [2]

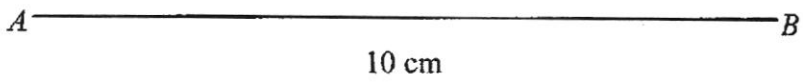
15. **(a)** Solve $3(2x-3)=4x-1$.

Answer: $x =$ _____ [2]

(b) If $n-2y=\frac{3y-n}{m}$, find the value of n when $y=5$ and $m=-3$.

Answer: $n =$ _____ [3]

16. A triangle ABC is such that $AB = 10$ cm, $BC = 6$ cm and $AC = 8$ cm. The line segment AB has been drawn below.



(a) Construct the triangle ABC. [2]

(b) Measure and write down $\angle ACB$.

Answer: _____ ° [1]

(c) Construct the angle bisector of $\angle ABC$. [1]

(d) Construct the perpendicular bisector of AB. [1]

(e) The perpendicular bisector of AB meets the angle bisector of $\angle ABC$ at point M. Measure and write down the length of BM.

Answer: _____ cm [1]

End of Paper

Class:	Candidate Name:	Candidate Index Number:

SHUQUN SECONDARY SCHOOL
2017 End-of-Year Examination
Secondary 1 Express

MATHEMATICS

PAPER 2

06 October 2017

Additional material: Writing paper
Graph paper (1 piece)

1 Hour 30 Minutes

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces at the top of this page and on all the work you hand in.
Write in blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staplers, paper clips, highlighters, 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.

Calculators should be used 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.

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 **50**.

This question paper consists of **6** printed pages.

[Turn over]

Answer **all** the questions.

1. (a) Factorise $4a+8aw-18ax$. [1]

(b) Simplify $\frac{2x+4}{3}-\frac{1-x}{4}$. [3]

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2. Some porcelain bowls are stacked up as shown below. The heights when 1, 2, 3 and 4 bowls are stacked up are 6 cm, 8.5 cm, 11 cm and 13.5 cm respectively.

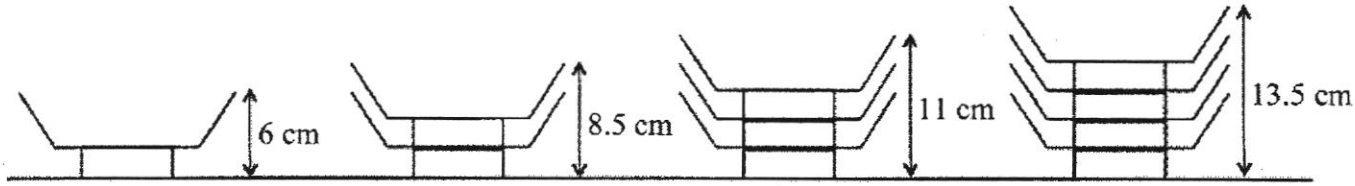

Figure number: $n=1$ $n=2$ $n=3$ $n=4$

(a) Find the height when 5 bowls are stacked up. [1]

(b) Express, in terms of n, the height when n bowls are stacked up. [2]

(c) Given that the height of a stack of bowls is 131 cm, find the number of bowls in the stack. [1]

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3. (a) Jimmy bought 264 blue pens, 216 black pens and 204 red pens. He packed an equal number of each colour into small packets without any leftover.

(i) What was the maximum number of packets he could pack? [2]

(ii) How many blue pens were there in each packet? [1]

(b) Cheryl, Lewis and Mark visit the Singapore Botanic Gardens every 3 days, 2 weeks and 9 days respectively. If they meet one another today, how many days later will they meet at the Singapore Botanic Gardens again? [2]

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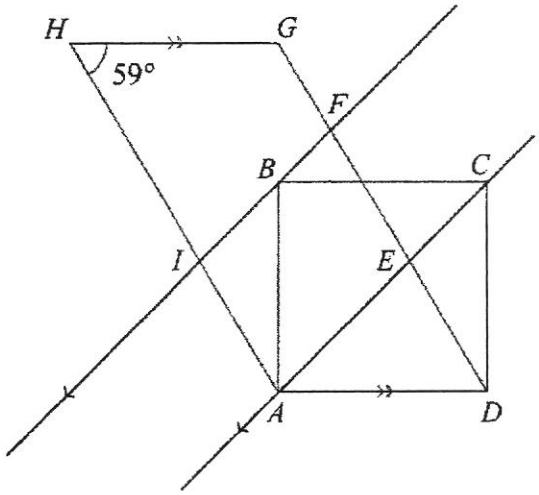
4. In the diagram below, $ABCD$ is a square and $ADGH$ is a parallelogram. The lines CEA and FBI are parallel lines.



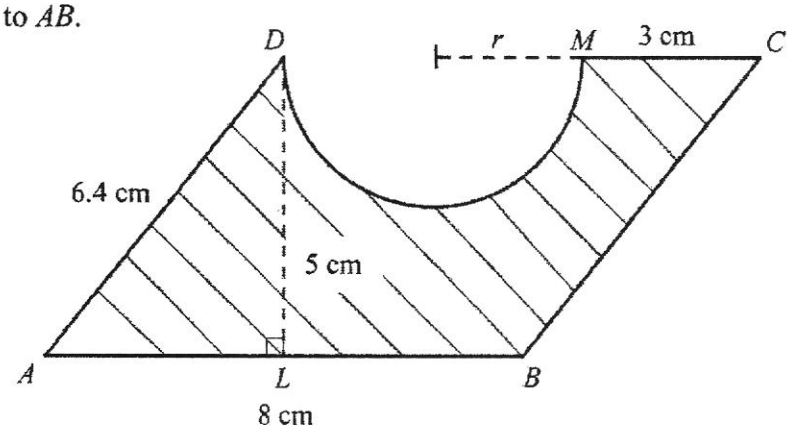
(a) Find $\angle DAH$. [1]

(b) Find $\angle CAH$. [2]

(c) Find $\angle GFI$. [2]

---

5. In the diagram below, $ABCD$ is a parallelogram where a semicircle DM has been cut out from it. It is given that $AB = 8$ cm, $AD = 6.4$ cm, $CM = 3$ cm and $DL = 5$ cm. DL is perpendicular to AB.



(a) Find the radius r of the semicircle DM. [1]

(b) Find the perimeter of the shaded region. [2]

(c) Find the area of the shaded region. [2]

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6. Chloe drove a distance of 360 km from Point A to Point B at an average speed of u km/h.

(a) Write down the expression for the time, in hours, that she took for the journey. [1]

(b) She then returned by the same route at an average speed of $2u$ km/h. Write down the expression for the time, in hours, that she took for the return journey. [1]

(c) Given that the difference between these two times was 2.5 hours, form an equation in u. Show that the equation can be reduced to $360 = 5u$. [2]

(d) Hence, solve the equation. [1]

(e) Find the time, in hours, Chloe took for the return journey. [1]

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7. The volume ratio of water, syrup and ice in an iced lemon tea drink is 7 : 2 : 3.

(a) Calculate the percentage of ice in the iced lemon tea drink. [1]

(b) Calculate the volume of water in a 600 ml iced lemon tea drink. [1]

(c) Given that the water costs \$1.80 per litre, the syrup costs \$14.40 per litre and the ice costs \$2.20 per litre, calculate the cost price of each 600 ml iced lemon tea drink. [2]

(d) If the drink is sold at a profit of \$0.50, find the selling price after applying GST of 7%, correcting your answer to the nearest cent. [2]

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8. Figure 1 below shows a water trough with a uniform cross section of trapezium shape. It is given that $AB = 35$ cm, $BC = 40$ cm, $EF = 21$ cm and $HM = 14$ cm.

(a) Find the volume of the water trough. [2]

(b) Figure 2 shows an open cylindrical container of height 30 cm. When all the water from the fully filled water trough is poured into the cylindrical container, the water reaches its brim.

(i) Find the radius r of the cylindrical container, leaving your answer to 3 significant figures. [2]

(ii) Find the total interior surface area of the open cylindrical container that is in contact with the water, leaving your answer to 3 significant figures. [2]

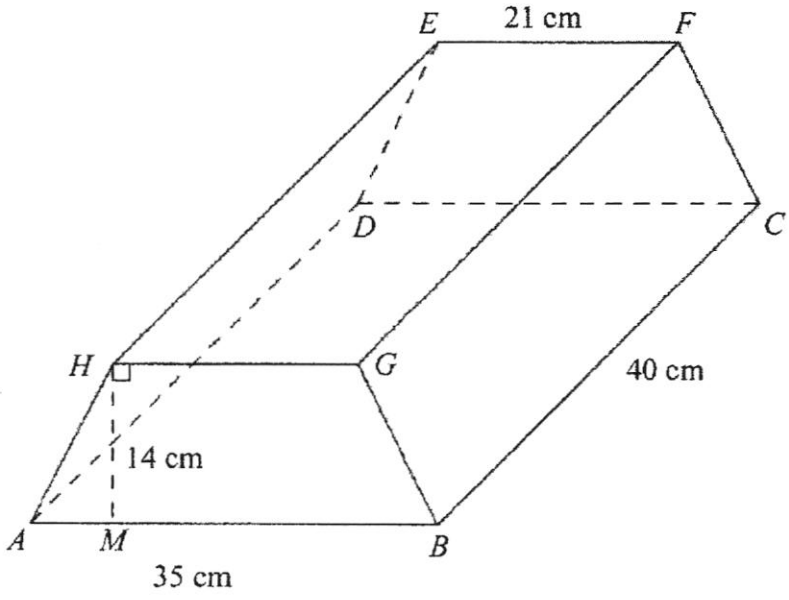


Figure 1

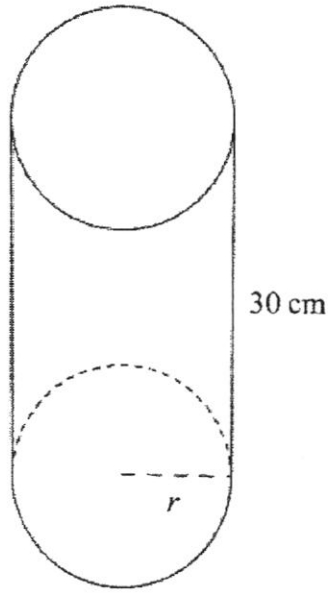


Figure 2

9. **Answer the whole of this question on a sheet of graph paper.**

The table below shows the corresponding x and y values for the equation:
$y = -2x + 3$.

x	-2	-1	0	1	2
y	7	a	3	b	-1

(a) Find the values of a and b. [2]

(b) Using a scale of 4 cm to represent 1 unit on the x-axis and 2 cm to represent 1 unit on the y-axis, draw the graph of $y = -2x + 3$ for $-2 \leq x \leq 2$. [3]

(c) From the graph, find the value of x when $y = 6$. [1]

(d) Draw the line $y = 2$ and state its gradient. [2]

(e) Find the coordinates of the point where the two graphs intersect. [1]

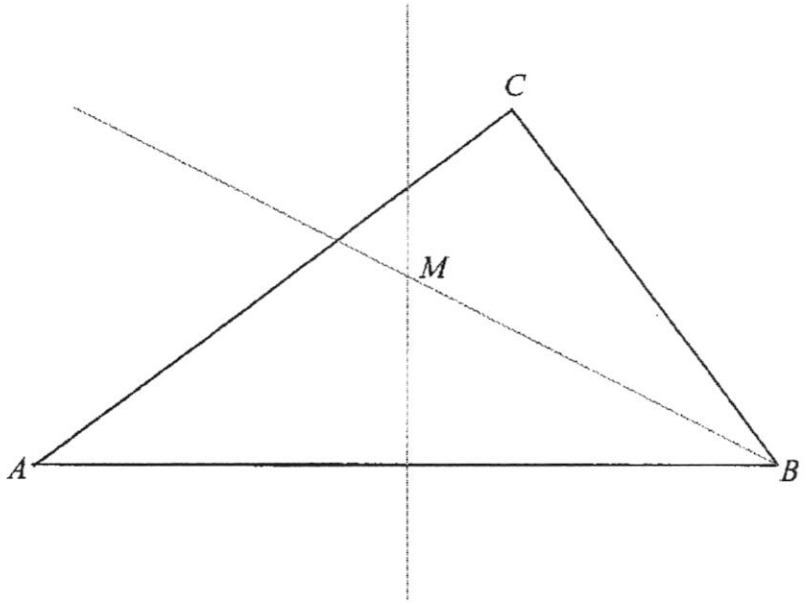
End of Paper

Answer Key to SQSS 1 EXP EOY P1 2017

Qn.	Answer	Marks
1.	164.5g	B1
2.	$-0.8,\ \frac{4}{5},\ 83\%,\ 0.8\dot{3},\ 0.\dot{8}\dot{3}$	B1
3.	(a) 9	B1
	(b) 7	B1
4.	(a) 175g	B1
	(b) 20 people	B1
5.	(a) -2	B1
	(b) 25	B1
6.	(a) 20°C	B1
	(b) 5 h --- 20°C 2 h --- 8°C Temperature at 1100 is 2°C.	$1\ h - -4\ °C$ – M1 A1
7.	10 km --- $\frac{2}{3}$h Average speed = $\frac{10km}{2/3\ h}$ =15 km/h	10 km or $\frac{2}{3}$h seen – M1 Applying s = d/t – M1 A1
8.	(a) $360 = 2^3 \times 3^2 \times 5$	A1 (M1 – for division method)
	(b) $z = 75$	B1
9.	(a) $7x = 180 - 110$ $x = 10$	B1
	(b) $y = 180 - 64 - 3(their\ 10) = 86$	B1
	(c) $3z + 1 = 64$ $z = 21$	B1
10.	(a) \$5	B1
	(b) 40 min	B1
	(c) \$21	B1

11.	(a) $(5-2)\times 180 = 540$ $x + 2x + 90 + 122 + 100 = 540$ $3x = 228$ $x = 76$	M1 M1 A1
	(b) 12 sides	B1
12.	(a) 4:1	B1
	$p:q = \frac{3}{4}:2$ (b) $= 3:8$ $= 6:16$ $p:r = \frac{1}{3}:\frac{1}{2}$ $= 2:3$ $= 6:9$ $q:r = 16:9$	 M1 (either 3:8 or 2:3 seen – ratio in integer) M1 (p:q:r or equivalent seen) A1
13.	(a) $30-3\times 8$ $= 6$	M1 A1
	$\sqrt{49}\times\sqrt[3]{27}$ (b) $= 7\times 3$ $= 21$	 M1 A1
14.	(a) $\frac{1}{250}$	B1
	(b) 2000%	B1
	(c) 70% --- \$581 100% --- \$830	M1 A1
15.	(a) $3(2x-3) = 4x - 1$ $6x - 9 = 4x - 1$ $2x = 8$ $x = 4$	 M1 A1
	$n - 2(5) = \frac{3(5)-n}{-3}$ $n - 10 = \frac{15-n}{-3}$ (b) $-3n + 30 = 15 - n$ $-2n = -15$ $n = 7.5$	 M1 M1 A1

16.	(a) as seen below.	B1 – AC = 8 cm B1 – BC = 6 cm (minus 1 mark if no working arc)
	(b) 90° ±1°	ecf 1 based on their drawn ΔABC
	(c) as seen below.	B1 (must see construction arcs & measure 26.5°)
	(d) as seen below.	B1 (must see construction arcs & measure 90° and 5cm)
	(e) BM = 5.6 cm $\pm 0.1cm$	ecf 1 based on their drawn ΔABC

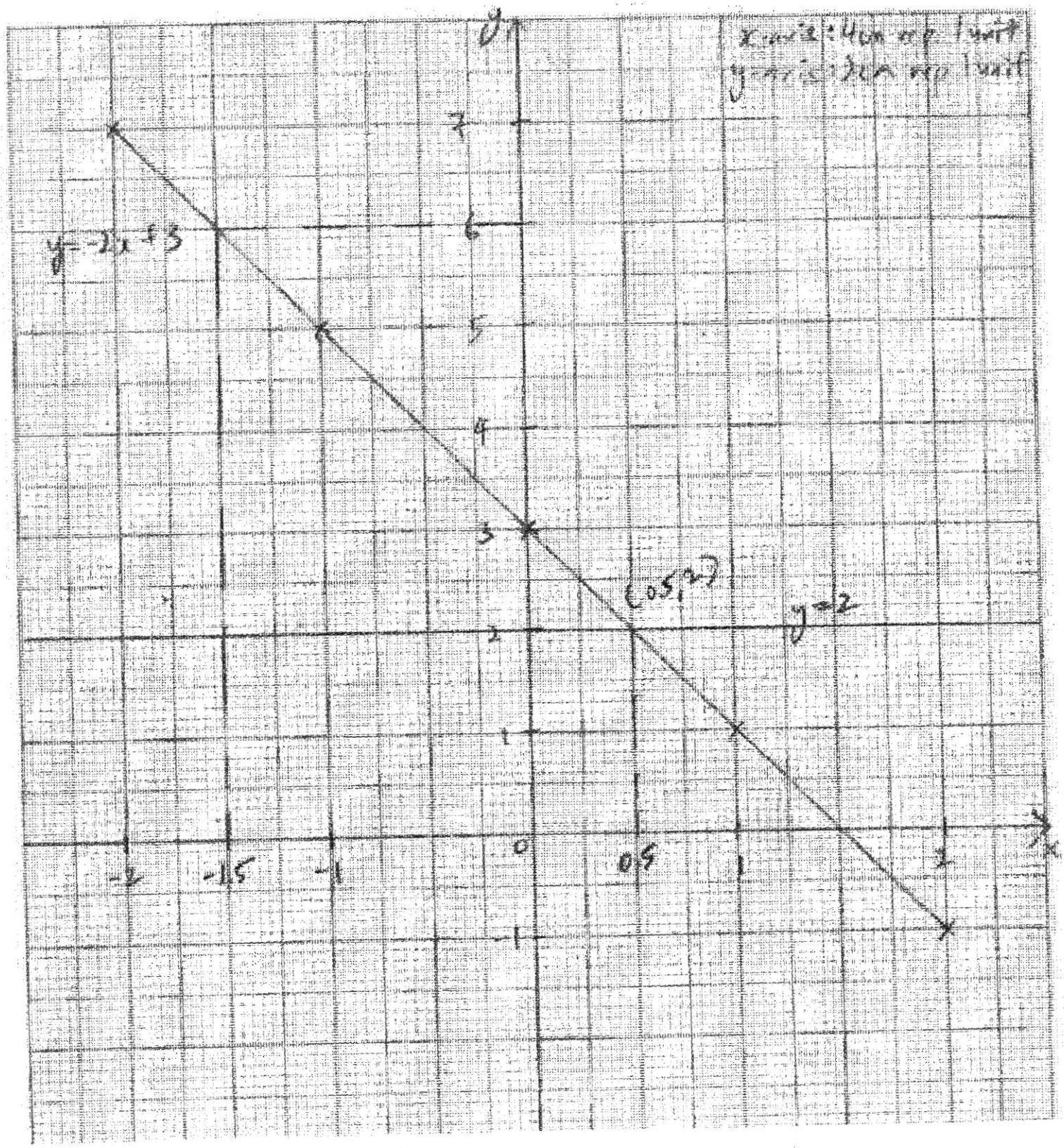


2017 SQSS 1Exp Maths EOY Paper 2 Answer Scheme

Question	Answer	Mark	Remarks
1(a)	$2a(2+4w-9x)$	B1	
1(b)	$\frac{2x+4}{3}-\frac{1-x}{4}$ $=\frac{4(2x+4)}{12}-\frac{3(1-x)}{12}$ $=\frac{4(2x+4)-3(1-x)}{12}$ $=\frac{8x+16-3+3x}{12}$ $=\frac{8x+3x+16-3}{12}$ $=\frac{11x+13}{12}$	M1 M1 A1	
2(a)	16 cm	B1	
2(b)	d = 2.5 cm $T_o = 6 - 2.5 = 3.5$ $T_n = 3.5 + 2.5n$	B1 B1	Accept other valid methods
2(c)	$3.5 + 2.5n = 131$ $2.5n = 127.5$ $n = 51$	B1	
3(a)(i)	2 | 264 216 204 2 | 132 108 102 3 | 66 54 51 22 18 17 HCF = 2 × 2 × 3 = 12	M1 A1	Award M1 for any correct method used to find HCF
3(a)(ii)	No. of blue pens = 22	B1	
3(b)	2 weeks = 14 days 2 | 3 14 9 3 | 3 7 9 3 | 1 7 3 7 | 1 7 1 1 1 1 LCM = 2 × 3 × 3 × 7 = 126	M1 A1	Award M1 for any correct method used to find LCM
4(a)	$\angle DAH = 180° - 59° = 121°$ (int. $\angle s, HG//AD$)	B1	
4(b)	$\angle CAD = \angle CAB = 45°$ (Line CA is an angle bisector) $\angle CAH = \angle DAH - \angle CAD = 121° - 45° = 76°$	M1 A1	Accept other correct methods
4(c)	$\angle AEG = 180° - 76° = 104°$ (int. $\angle s, HA//GE$) $\angle GFI = \angle AEG = 104°$ (corr.	M1 A1	Accept other correct methods

	$\angle s, IF \ // AE)$		
5(a)	Diameter = 8 – 3 = 5 cm r = 2.5 cm	B1	
5(b)	Perimeter of shaded region $= 6.4 + 8 + 6.4 + 3 + \frac{1}{2}(2\pi \times 2.5)$ = 31.65398… = 31.7 cm (to 3 s.f.)	M1 A1	
5(c)	Area of the shaded region = Area of parallelogram – area of semicircle $= 8 \times 5 - \frac{1}{2}\pi(2.5)^2$ = 30.18252… = 30.2 cm^2 (to 3 s.f.)	M1 A1	
6(a)	Time taken = $\frac{360}{u}$ hours	B1	
6(b)	Time taken = $\frac{360}{2u}$ hours	B1	
6(c)	$\frac{360}{u} - \frac{360}{2u} = 2.5$ $\frac{720}{2u} - \frac{360}{2u} = \frac{5u}{2u}$ $720 - 360 = 5u$ $360 = 5u$ (shown)	M1 A1	
6(d)	$5u = 360$ u = 72 km/h	B1	
6(e)	Time taken = $\frac{360}{2(72)}$ = 2.5 hours	B1	
7(a)	Percentage of ice $= \frac{3}{12} \times 100\% = 25\%$	B1	
7(b)	Volume of water $= \frac{7}{12} \times 600 = 350$ ml	B1	
7(c)	Volume of syrup = $\frac{2}{12} \times 600 = 100$ ml Volume of ice = $\frac{3}{12} \times 600 = 150$ ml Cost price $= \frac{350}{1000} \times 1.80 + \frac{100}{1000} \times 14.40 + \frac{150}{1000} \times 2.20$ = \$0.63 + \$1.44 + \$0.33 = \$2.40	M1 A1	
7(d)	Selling price before GST = \$2.40 + \$0.50 = \$2.90 Selling price after GST = 1.07 × \$2.90 = \$3.103 = \$3.10 (to the nearest cent)	M1 A1	

8(a)	Volume of water trough = area of trapezium cross section × length of trough $= \left[\frac{1}{2}(35 + 21) \times 14\right] \times 40$ $= 15\,680\ \text{cm}^3$	 M1 A1	
8(b)(i)	Volume of water trough = volume of cylindrical container = $15\,680\ \text{cm}^3$ $\pi r^2(30) = 15\,680\ \text{cm}^3$ $r^2 = \frac{15680}{30\pi}$ $r = \sqrt{\frac{15680}{30\pi}}$ $= 12.898448\ldots$ $= 12.9$ cm (to 3 s.f.)	 M1 A1	
8(b)(ii)	Total interior surface area $= \pi r^2 + 2\pi rh$ $= \pi(12.9)^2 + 2\pi(12.9)(30)$ $= 2954.3851\ldots$ $= 2950\ \text{cm}^2$ (to 3 s.f.)	 M1 A1	
9(a)	$a = 5$ $b = 1$	B1 B1	
9(b)	**Refer to attached graph**	P2 C1	P2 for all 5 correct points plotted. (Award 1 mark for 3 correct points plotted) C1 for straight line accurately drawn
9(c)	$x = -1.5$	B1	
9(d)	**Refer to attached graph** (Line y = 2) Gradient = 0	B1 B1	
9(e)	Coordinates of point of intersection: (0.5, 2)	B1	


$x_{min}=-2$: 4cm ต่อ 1 unit
$y_{min}=-1$: 2cm ต่อ 1 unit
$y=-2x+5$
(0.5, 4)
$y=2$
-2
-1.5
-1
0
0.5
1
2
3
4
5
6
3
2
1
-1