Class	Index Number	Name

ANG MO KIO SECONDARY SCHOOL
MID-YEAR EXAMINATION 2012
SECONDARY ONE EXPRESS

Mathematics Part One

Setter: Ms Rachael Wu

Thursday 9 May 2012 1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams or graphs.
Do not use 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.

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**.

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50

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Answer all the questions.

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1 Express

(a) 0.085 as a fraction in its simplest form,

(b) 4 % as a decimal.

Answer (a) .....[1]

(b) ..... [1]

2 **(a)** Express

(i) 365.11,

(ii) 0.02581

to **two** significant figures.

(b) Hence estimate the value of 365.11×0.02581, correct to **one** significant figure.

Answer

(a)(i)..... [1]

(ii)..... [1]

(b) ..... [1]

3 Arrange the following numbers in ascending order

$$-0.37,\ -0.373,\ -0.3\dot{7},\ -\frac{16}{42},\ -0.\dot{3}7\dot{3}.$$

Answer ..... [1]

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4 **(a)** Express 1500 as the product of its prime factors.

(b) Given that $1500x$ is a perfect square, write down the smallest possible value of x.

(c) Find the highest common factor of 1500 and $2 \times 3^2 \times 5^2 \times 7$, leaving your answer in index form.

Answer (a) .....[2]

(b) $x =$ .....[1]

(c) .....[1]

5 Consider the numbers stated below.

$$81,\ \sqrt{2},\ -6,\ 0,\ \frac{2}{5},\ 9,\ \pi,\ 7.$$

(a) List the perfect square(s).

(b) State the natural number(s).

(c) List the irrational number(s).

Answer *(a)* .....[1]

(b) .....[1]

(c) .....[1]

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6 In a class election, $\frac{7}{8}$ of those entitled to vote did so. There were 3 candidates and the votes for these candidates were divided in the ratio of $4:2:1$. Given that 40 people were entitled to vote, calculate

(a) the number of voters who did not vote at all,

(b) the number of voters who voted for the candidate with the most votes.

Answer (a) .....[1]

(b) .....[2]

7 Given that $a=-2, b=3$ and $c=5$, evaluate $(a-b)^2 \times (c+ab)^3$.

Answer ..... [2]

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8 **(a)** If $A : B = 2 : 1$ and $B : C = 3\frac{2}{5} : 0.4$, find the ratio $A : B : C$.

(b) In what ratio must 142 kg be decreased to become 118 kg?

Answer (a)..... : ..... : ..... [2]

(b) ..... : ..... [1]

9 **(a)** Expand $3(x+4)-2(x-6)$.

(b) Factorise $3ax+9ay-12az$.

Answer (a) ..... [2]

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(b) ..... [1]

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10 Simplify the following

(a) $3a + 6b + 5a - 3b + 4$,

(b) $2p \times 3q \times (-4q)$,

(c) $9x - 4[2(1-3x) - 2(3-3x)]$.

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Answer *(a)* ..... [1]

(b) ..... [1]

(c) ..... [2]

11 **(a)** Convert

(i) 0.8 km² to m²,

(ii) 88 m/s to km/h.

(b) Express 32.196 cm to the nearest $\frac{1}{10}$ mm.

Answer

(a)(i).....m² [1]

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(ii)..... km/h [2]

(b)..... mm [1]

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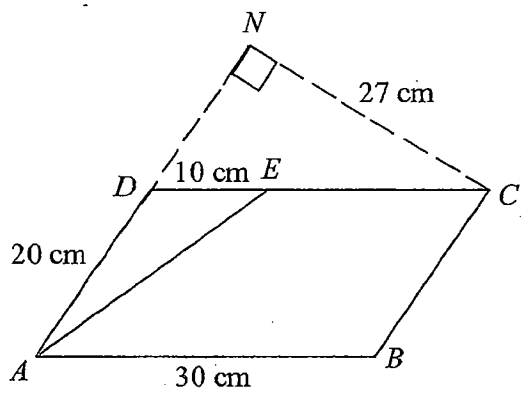
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12 In the figure, $ABCD$ is a parallelogram, $AB = 30$ cm, $AD = 20$ cm, $DE = 10$ cm and $CN = 27$ cm. Find

(a) the area of the parallelogram $ABCD$,

(b) the height of the trapezium $ABCE$

(c) the area of the trapezium $ABCE$.



Answer *(a)* ..... cm^2 [1]

(b) ..... *cm* [2]

(c) ..... cm^2 [2]

13 By selling a particular set of books for \$408, a bookseller suffers a loss of 4%.

(a) Find the original price of the books paid by the bookseller.

(b) Calculate the percentage gain or loss if the books are sold for \$510.

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Answer (a) $ ..... [2]

(b)

.....% [2]

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14 The number of goals scored by a football team in each of the 20 matches was as follows.

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2	1	3	6	0
2	2	1	5	3
1	3	4	1	1
5	0	2	1	5

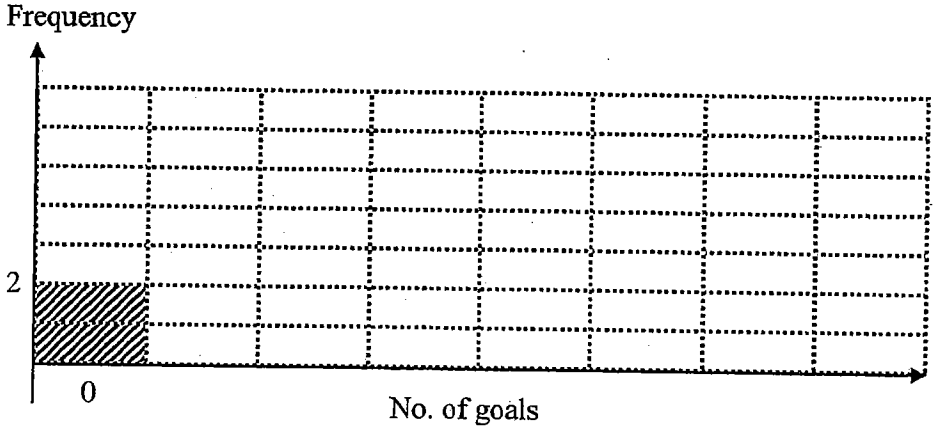
(a) Complete the frequency table below.

(b) Construct a histogram in the space provided.

Answer (a) [2]

No. of goals	Tally	Frequency
0	//	2
1		
2		
3		
4		
5		
6		

(b) [2]

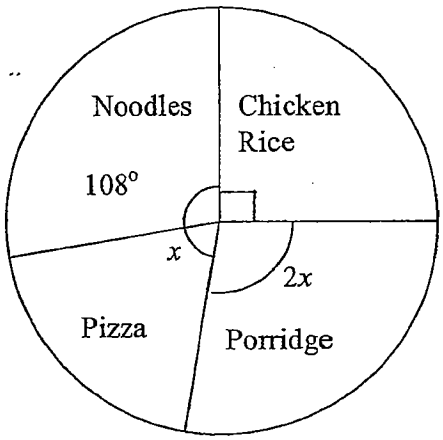


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15 A survey was conducted on a class of 40 pupils to find out their favourite food. The results are represented on the given pie chart.



(a) How many pupils chose porridge as their favourite food?

(b) Express the ratio of the number of pupils who chose porridge to the number who chose chicken rice, as simply as possible.

(c) Later in the year, 5 pupils joined the class and said their favourite food is noodles. Calculate the percentage increase in the number of pupils who chose noodles as their favourite food.

Answer (a) ..... pupils [2]

[Turn Over

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(b) ..... : ..... [1]

(c) .....% [2]

End of Paper

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ANG MO KIO SECONDARY SCHOOL
MID-YEAR EXAMINATION 2012
SECONDARY ONE EXPRESS

MATHEMATICS PART TWO

Setter: Mr Tan Wee Hong

Tuesday **8 May 2012** **1 HOUR 15 MINUTES**

Additional materials:
Answer Paper
Electronic Calculator

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces provided on the answer paper.
Write your answers and working on the separate answer paper provided.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

Show all your working on the same page as the rest of 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.

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**.

This question paper consists of 8 printed pages.

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Section A (22 marks)
Answer ALL the questions

1 **(a)** Use a calculator to evaluate

(i) $\dfrac{\left(5\frac{1}{2}\right)^2 + 2\frac{1}{3}}{\left(-1-\frac{1}{4}\right)^3}$, giving your answer correct to 2 decimal places, [1]

(ii) $\sqrt[3]{12.3-4\pi+0.29}$, giving your answer correct to 4 significant figures. [1]

(b) The table below shows the temperature in a number of cities at noon on a particular day.

Singapore	Taipei	Paris
25 °C	11 °C	5 °C

(i) Find the temperature in London if the temperature in Taipei was exactly midway between the temperatures in Singapore and London? [1]

(ii) The temperature in Paris at 6 pm on the same day was -7 °C. Given that the temperature increased at a constant rate, what time was the temperature at 0 °C? [2]

2 Abby weighs $4x$ kg and Betty weighs 8 kg more than Abby. Cassandra's weight is half the total weight of Abby and Betty. Write an expression, in terms of x, for

(i) Betty's weight, [1]

(ii) average weight of the 3 girls. [2]

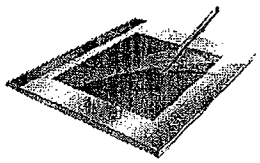
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3 **(a)** Factorize $3ac - 9c + 6ab - 18b$ completely. [2]

(b) Simplify $\frac{x}{5} - \frac{x-2}{15}$, giving your answer as a fraction in its simplest terms. [2]

4 Alaric and Damon each purchased the latest tablet computer, ePad, during its launch day. The poster below shows the deals offered by the shop they went to.

ePad Launch Day Specials



Price: $1016.50 (by cash)
$1070.00 (by credit card)

VIP members enjoy special percentage discount!
All prices inclusive of 7% GST.

(a) Calculate the amount of GST paid by Alaric if he bought an ePad using cash. [2]

(b) Alaric decides to sell away the ePad for $1280.79. Find the percentage profit made. [2]

(c) Damon bought the ePad using his credit card. However, as he is a VIP member, he ends up paying the price as Alaric. What is the percentage discount offered to VIP members? [2]

[Turn Over

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5 A laundry company provides cleaning of clothing such as shirts, jackets, skirts and trousers. In one particular week, $\frac{2}{5}$ of the clothing sent in for washing are shirts, $\frac{3}{8}$ of the clothing are jackets and the remaining of the clothing are skirts and trousers in the ratio of 2 : 1.

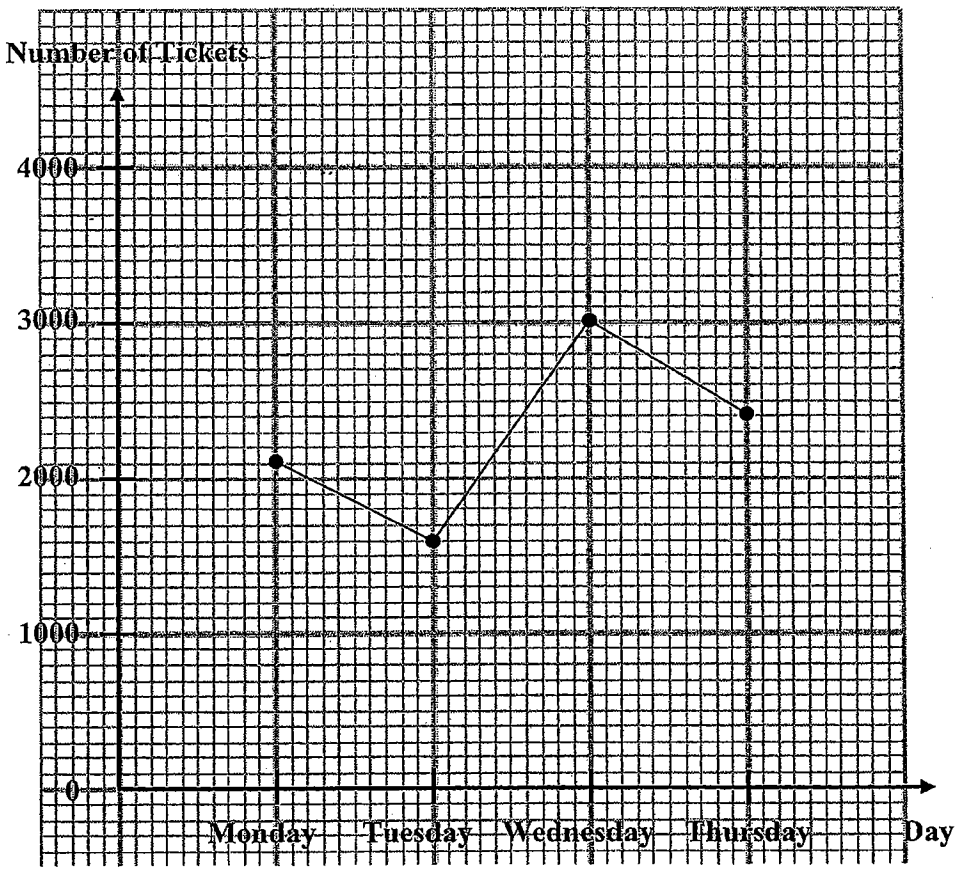
(a) If there are 108 skirts, find the total number of pieces of clothing. [2]

(b) Given that it takes $\frac{6}{125}$ kg of washing powder to wash each piece of clothing, how many pieces of clothing will be left unwashed if the shop only has 20 kg of washing powder? [2]

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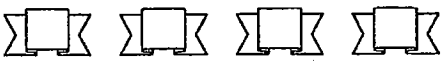
Section B (28 marks)
Answer ALL the questions

6 The line graph below shows the number of tickets sold for the movie *The Starvation Games* from Monday to Thursday on a certain week.



(a) Calculate total amount of money collected from ticket sales from Monday to Thursday if each ticket is priced at $7.50. [2]

The pictogram below shows the number of tickets sold on Thursday and Friday from the same week.

Thursday	
Friday	

(b) Calculate the number of tickets sold on Friday. [2]

[Turn Over

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(c) Find the number of tickets sold on Friday as a percentage of the total number of tickets sold from Monday to Friday. [2]

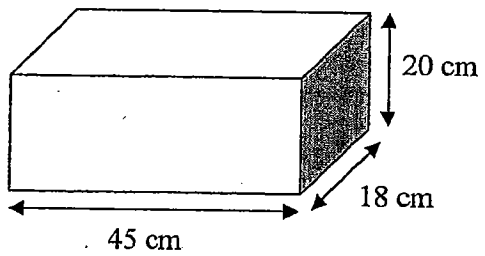
(d) Find the total number of tickets sold on both Saturday and Sunday if they formed $\frac{8}{13}$ of all tickets sold for the whole week. [2]

7 **(a)** During AMKSS Alumni Homecoming Day, 540 fish balls and 432 chicken wings are catered for the guests. Given that the food is to be shared equally among the guests, find

(i) the largest possible number of guests that can be invited. [2]

(ii) the number of chicken wings each guest will receive. [1]

(b) The diagram below shows a concrete block measuring 45 cm by 18 cm by 20 cm. An engineer wants to build cubes using these concrete blocks.



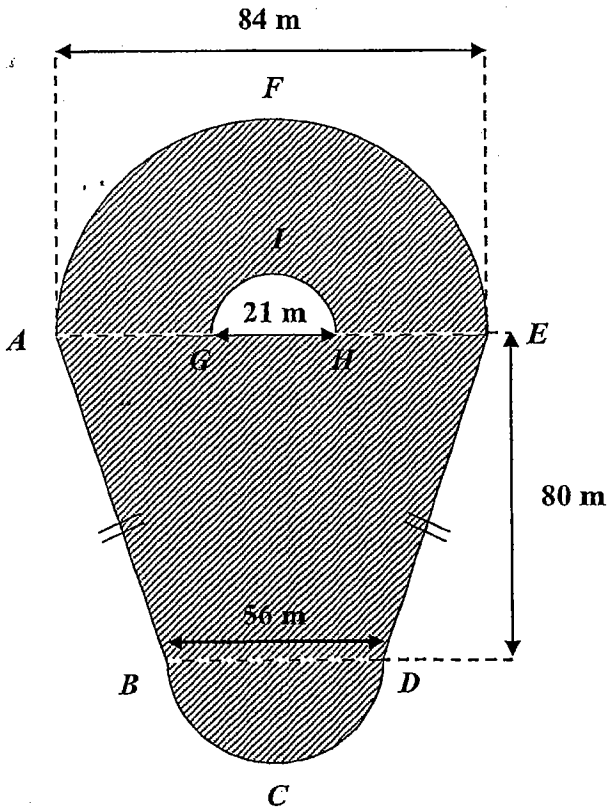
Find

(i) the smallest possible length of side of a cube that can be built, [2]

(ii) the number of blocks needed to build 5 such cubes. [1]

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8



The above diagram shows the design (not drawn to scale) for a new water reservoir, Lagoon Barrage. It is made up of trapezium $ABDE$ of height 80 m, semicircles BCD and AFE with semicircle GHI cut out of it. It is given that $AB = ED$, $AE = 84$ m, $GH = 21$ m and $BD = 56$ m. (Take $\pi = \frac{22}{7}$)

(a) Given that the outer perimeter of Lagoon Barrage is 420 m, find the length of AB. [3]

(b) **(i)** The shaded region shows the area of Lagoon Barrage. Calculate the area of Lagoon Barrage. [3]

(ii) A contractor is employed to plant grass on the shaded region indicated on the diagram. Given that he charges \$0.50 for each 0.25 m^2 of grass, calculate the total cost of grass needed. [2]

[Turn Over

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9 A plane travelling from Singapore to Sydney was supposed to leave Singapore at 2250 h Monday and travel at a constant speed of 825 km/h to reach Sydney at 0610 h Tuesday.

(a) Find the distance between Singapore and Sydney. [2]

(b) On the actual day, the plane stopped over at Jakarta along the journey to repair a technical problem after travelling for 770 km. At what time did the plane reach Jakarta? [2]

(c) The stop-over at Jakarta took 1 hour and 24 minutes. The plane then continued the rest of the journey to Sydney at a faster speed. At what speed did the plane travel from Jakarta to Sydney if it still reached Sydney at the schedule time? [2]

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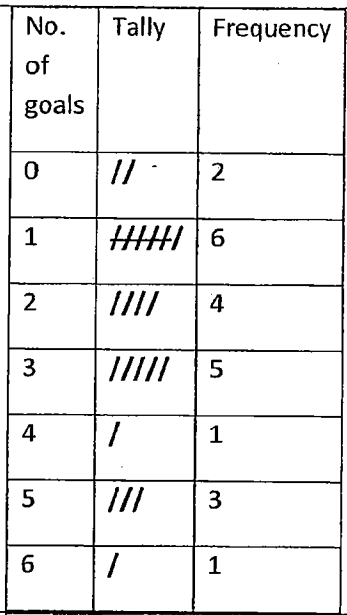
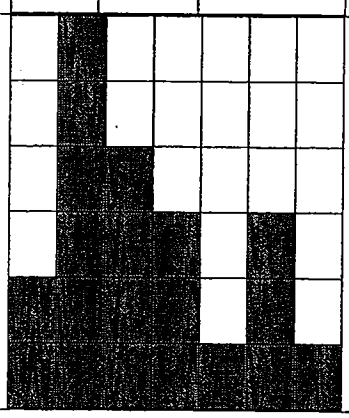
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	Answers	Marking Scheme	Marker's Remarks
1(a)	17/200	B1	
1(b)	0.04	B1	
2a(i)	365.11		
2a(ii)	0.02581		
2(b)(a)(i)	370	B1	
2(b)(a)(ii)	0.026	B1	
2(b)	365.11 x 0.02581 = 9.6 =10	B1	
3	-16/42, -0.37, -0.373, -0.373, -0.37	B1	
4(a)	2^2x3x5^3		
4(b)	X=15		
4(c)	$2x3x5^2$		
5(a)	9,81	B1	
5(b)	7,9,81	B1	
5(c)	$\sqrt{2}, \pi$	B1	
6(a)	1/8 x 40 = 5	B1	
6(b)	40 – 5 = 35 4/1 x 35 = 20	M1 A1	
7	$[(-2)-3]^2 x [5+(-2)(3)]^3$ $=25 x (-1)^3$ =-25	M1 A1	
8(a)	17/5 x 2 = 1 x (17/5)		

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	= B:C $3^{2/5} = 0.4$ 17/5 = 2/5 = A:B:C = 34:17:2	A1	
8(b)	59:71	B1	
9(a)	3(x+4) – 2(x-6) = 3x + 12 – 2x +12 = x+24	M1 A1	
9(b)	3ax + 9ay – 12az = 3a (x+3y – 4z)	B1	
10(a)	3a+6b+5a - 3b+4 =8a+3b+4	B1	
10(b)	$-24pq^2$	B1	
10(c)	9x – 4[2-6x – 6+6x] 9x – 4[-4] =9x +16	M1 A1	
11(a)	$0.8km^2 = 0.8 \times 1000^2$ $800000m^2$	B1	
11(b)	88m/1s = 88÷1000/1÷3600 = 316.8km/h	M1 A1	
11(c)	32.196 ≈ 322.0mm	B1	
12(a)	Area of ABCD =20 x 27 $=540cm^2$	B1	
12(b)	30n = 540 n = 18m	B1	
12(c)	Area of trapezium		

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	= ½ x (30+20) x 18 $=450cm^2$	M1 A1	
13(a)	96% - 408 100% - $425	M1 A1	
13(b)	% gain = 85/425 x 100% 20%	M1 A1	
14(a)			
14(b)			
15(a)	3x + 108 + 90 = 360 X = 54° 2x = 108° 360 – 40 108 – 12	A1	
15(b)	108 : 90 6:5	B1	
15(c)	% increase = 5/12 x 100		

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	=41.7%	A1	

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Secondary One Express Mid-Year Examination 2012 Paper Two
Marking Scheme

Qn	Answer	Marking Scheme	Marker's Remarks
Points to Highlight: • Quite a number of students do not include units in their answers (minus 1 mark overall). • Many students wrote out their final answer separately again after each question. This step is unnecessary and some make mistake when rewriting the answer down. E.g. $\frac{\left(5\frac{1}{2}\right)^2+2\frac{1}{3}}{\left(-1-\frac{1}{4}\right)^3}=-16.68266667=-16.68$ Answer: 16.68. • Presentation of word problems is poor, without statements given for each key step. • A few students do not represent their answers in the correct fractional form, e.g. they wrote $20\div\frac{6}{125}$ as 416R4 instead of $416\frac{2}{3}$.			
1(a)(i)	$\frac{\left(5\frac{1}{2}\right)^2+2\frac{1}{3}}{\left(-1-\frac{1}{4}\right)^3}=-16.68266667=-16.68$	B1	A few students forgot to cube the denominator. Quite a number of students forgot to include the negative sign. $-16\frac{256}{375}$ is not accepted.
1(a)(ii)	$\sqrt[3]{12.3-4\pi+0.29}=0.286957431=0.2870$	B1	0.2802 is also accepted (if student used $\pi=3.142$).
1(b)(i)	Temperature in London = $2(11)-25=-3\,^{\circ}C$.	B1	Quite a number of students gave $25-22=3\,^{\circ}C$ as the answer. A few students thought the question wanted the midway temperature of 25°C and 11°C.

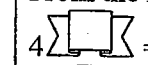
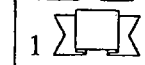
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1(b)(ii)	Difference in temperature $= 5-(-7)=12\,°C$. Decrease of 12 °C → 6 hours Decrease of 1 °C → 0.5 hours Time at which temperature is 0 °C = 12 pm + 0.5 (5) hours = 2.30 pm.	M1 A1	Generally ok. A small number of students used the temperature in London from (b)(i) instead of temperature in Paris.
2(i)	Betty's weight $=(4x+8)$kg.	B1	Well done. $4(x+2)$kg is accepted.
2(ii)	Cassandra's weight $=\frac{4x+4x+8}{2}=(4x+4)$kg. Total weight of the 3 girls $=\frac{4x+4x+8+4x+4}{3}$ $=\frac{12x+12}{3}$ $=(4x+4)$kg.	M1 A1	Some students thought Cassandra's weight is half of Betty's. M1 is awarded if the student wrote out correct expression for the average weight but simplified wrongly. $4(x+1)$ kg is accepted.
3(a)	$3ac-9c+6ab-18b$ $=3c(a-3)+6b(a-3)$ $=(3c+6b)(a-3)$ $=3(c+2b)(a-3)$.	M1 A1	Badly done. Many students did not factorize out the 3. Some students did not factorize and instead attempted to add/subtract the terms, e.g. $3ac-9c+6ab-18b$ $=3a-6c+6a-12b$. Shows poor understanding of like/unlike terms.
3(b)	$\frac{x}{5}-\frac{x-2}{15}$ $=\frac{3x}{15}-\frac{x-2}{15}$ $=\frac{3x-x+2}{15}$ $=\frac{2x+2}{15}$.	M1 A1	Badly done. Common mistake: $\frac{3x-x-2}{15}=\frac{2x-2}{15}$. No mark given if student changed the sign before combing the fractions into one, e.g. $\frac{3x}{15}-\frac{x-2}{15}=\frac{3x}{15}-\frac{x+2}{15}$.
4(a)	Amount of GST paid $=\frac{7}{107}\times 1016.50$ = \$66.50.	M1 A1	Quite a number of students thought 100% = \$1016.50 and did not realize that GST is already inclusive.

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4(b)	Percentage profit $= \frac{1280.79 - 1016.50}{1016.50} \times 100\%$ $= 26\%$.	M1 A1	1 mark given if the student used the wrong price due to (a) (i.e. \$1087.70 instead of \$1016.50) in the calculations. No mark given if student gave final answer as $\frac{1280.79}{1016.50} \times 100\% = 126\%$
4(c)	Percentage discount for VIP $= \frac{1070 - 1016.50}{1070} \times 100\%$ $= 5\%$.	M1 A1	Full credit given if the student consistently added GST to all his/her prices and got the same final answer, e.g. $\frac{1144.90 - 1087.70}{1087.70} \times 100\% = 5\%$
5(a)	Fraction of clothing which are skirts $= \left[1 - \left(\frac{2}{5} + \frac{3}{8}\right)\right] \times \frac{2}{3}$ $= \frac{3}{20}$. Total number of pieces of clothing $= 108 \div 3 \times 20 = 720$.	 M1 A1	Quite a number of students misread the question and thought jackets form $\frac{3}{8}$ of the remainder.
5(b)	Largest possible number of pieces of clothing that can be washed $= 20 \div \frac{6}{125} = 416.6666667$ $= 416$. Number of pieces of unwashed clothing $= 720 - 416 = 304$.	 M1 A1	M1 given if incorrect total from (a) is used. A few students gave 303 as the answer.
6(a)	Total number of tickets $= 2100 + 1600 + 3000 + 2400$ $= 9100$. Total amount of money $= 9100 \times \$7.50$ $= \$68250$.	 M1 A1	Generally well done. A small number of students read the graph values as 2010, 1060 and 2040.

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6(b)	From the line graph. 4  = 2400 tickets 1  = 600 tickets Number of tickets sold on Friday $= 600 \times 6.5$ $= 3900.$	 M1 A1	Generally ok. A few students thought that there are 7.5  for Friday.
6(c)	Percentage of total tickets $= \frac{3900}{9100+3900} \times 100\%$ $= 30\ \%.$	 M1 A1	Generally well done. Loss of marks is mostly due to wrong answers from (a) and (b).
6(d)	$\frac{5}{13}$ of tickets = 13000 $\frac{1}{13}$ of tickets = 2600 Total number of tickets sold on Saturday and Sunday $= 2600 \times 8$ $= 20800.$ Alternatively, Total number of tickets sold on Saturday and Sunday $= \frac{8}{5} \times 13000$ M1 $= 20800.$ A1	 M1 A1	Some students thought that $\frac{13}{13}$ of tickets = 13000. A few found the total for the whole week instead of just Saturday and Sunday.
7(a)(i)	2 | 540 | 432 2 | 270 | 216 3 | 135 | 108 3 | 45 | 36 3 | 15 | 12 5 | 4 Largest possible number of guests $= 2^2 \times 3^3$ $= 108.$	 M1 A1	Generally ok. Trial-and-error methods are accepted only if the working shows clearly (with explanation or by ratio) that 108 is the largest possible number of guests. Unacceptable: $540 \div 108 = 5$; $432 \div 108 = 4$ Or $540 \div 5 = 108$; $432 \div 4 = 108$.
7(a)(ii)	Number of chicken wings per guest $= \frac{432}{108}$ $= 4.$	 B1	Generally ok.

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7(b)(i)	2 | 45 18 20 2 | 45 9 10 3 | 45 9 5 3 | 15 3 5 5 | 5 1 5 1 1 1 Smallest possible length $= 2^2 \times 3^2 \times 5$ $= 180$ cm.	M1 A1	Badly done. Many thought the question is asking for HCF. Listing multiples of 45, 18 and 20 is accepted, e.g. Multiples of 45 = 45, 90, 135, 180. Multiples of 18 = 18, 36, 54, 72, 90, 108, 126, 144, 162, 180. Multiples of 20 = 20, 40, 60, 80, 100, 120, 140, 180. However, the following method is not accepted: $45 \times 4 = 180$; $18 \times 10 = 180$; $20 \times 9 = 180$ as it does not show that 180cm is the smallest possible length.
7(b)(ii)	Number of blocks need $= 4 \times 10 \times 9 \times 5$ $= 1800$.	B1	Badly done. Many students forgot that the question requires 5 cubes or have the wrong answer from (b)(i).
8(a)	Perimeter of the arcs *AFE* and *BCD* $= \frac{1}{2}(84)\left(\frac{22}{7}\right) + \frac{1}{2}(56)\left(\frac{22}{7}\right) = 220$ m. $2AB = 420 - 220$ $AB = 100$ m.	M1 M1 A1	Some students do not realize that they need to half the circumference to find the length of the semi-circular arcs. M1 given for correct formula for circumference of semicircle. 2nd M1 is not given if students did not show that they know that 420 – 220 is for 2 times of *AB*.
8(b)	Area of the semi-circle *BCD* and ring *AGIHEF* $= \frac{1}{2}(42)^2\left(\frac{22}{7}\right) + \frac{1}{2}(28)^2\left(\frac{22}{7}\right) - \frac{1}{2}(10.5)^2\left(\frac{22}{7}\right)$ $= 3830.75$ m^2. Area of trapezium *ABDE* $= \frac{1}{2}(84+56)(80)$ $= 5600$ m^2. Total Area $= 3830.75 + 5600$ $= 9430.75$ m^2.	M1 M1 A1	Some of the students do not know how to calculate area of trapezium *ABDE*. M1 given if student is able to find area of any 1 of the semi-circles.

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8(b)(ii)	Total cost of grass $= \frac{9430.75}{0.25} \times 0.50$ $= \$18861.50.$	M1 A1	Generally ok. Incorrect answers are due to (b).
9(a)	Time taken $= 7\frac{1}{3}$h. Distance $= 825 \times 7\frac{1}{3}$ $= 6050$km.	M1 A1	Surprisingly, quite a number of students cannot calculate the duration between 2250h and 0610h correctly, resulting in answers like $6\frac{1}{3}$h or $8\frac{1}{3}$h.
9(b)	Time taken to travel from Singapore to Jakarta $= \frac{770}{825} = \frac{14}{15}$h. 2250 h $\xrightarrow{+ 56 \text{ minutes}}$ 2346 h or 11.46 pm.	M1 A1	Generally well done.
9(c)	Time left to travel from Jakarta to Sydney $= 7\frac{1}{3} - \frac{14}{15} - 1\frac{2}{5} = 5$h. Speed of plane $= \frac{6050 - 770}{5}$ $= 1056$ km/h.	M1 A1	Some students forgot to deduct the wait time from the total time or have difficulty calculating the duration again.

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