聖嬰中學
HOLY INNOCENTS' HIGH SCHOOL

END-OF-YEAR EXAMINATION 2012
SECONDARY 1 EXPRESS

MATHEMATICS **4016/01**

Paper 1

Name : _____ Date : 11 October 2012

Register No : _____ Duration : 1 h 30 min

Class : _____

Additional Materials needed: Nil

Students answer on the Question Paper.

Instructions to Candidates

Write your index number and name on all the work you hand in.
Write in dark 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.
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 marks for this paper is 60.

Setter: Ms Lua Bee Hian

This paper consists of 11 printed pages, inclusive of this cover page.

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Answer all the questions

1. (a) Express $1\frac{3}{8}$ as a percentage.

   (b) Express 25.8% as a fraction in its simplest form.

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

(b) ..... [1]

2. (a) Calculate $\frac{4.5^2}{\sqrt{69.1}+31.8}$, showing all the figures on your calculator display.

   (b) Give your answer correct to 2 significant figures.

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

(b) ..... [1]

3.

	Japan	Singapore	Iceland
Highest	18°C	33°C	−1°C
Lowest	−1°C	24°C	−9.2°C

The table shows the highest and lowest temperatures on a particular day in Japan, Singapore and Iceland.

Find

(a) the difference between the highest and lowest temperature in Iceland,

(b) the country with the largest temperature difference on that day.

Answer (a) ..... °C [1]

(b) ..... [1]

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4. Given that $m = -2$ and $n = 3$, evaluate

(a) $\frac{1}{3}(2m - 7mn)$,

(b) $\sqrt[3]{m^2n + 5n}$.

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

(b) ..... [1]

5. Solve $5(6 + x) - x > 0$.

Answer ..... [2]

6. Three different lights flash at regular intervals.
The red, orange and green light flashes every 15 seconds, 21 seconds and 36 seconds respectively.
The three lights flash together at 06 00.

At what time do they next flash together?

Answer ..... [3]

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7. Consider the numbers below

$$-\frac{\pi}{11}, \quad 4.718, \quad \frac{21}{37}, \quad \sqrt{9}, \quad \sqrt[3]{64}.$$

Write down

(a) the irrational number(s),

(b) the prime number(s),

(c) the perfect square number(s).

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

(b) ..... [1]

(c) ..... [1]

8. Given $-4 \le x \le 2$ and $3 \le y \le 7$,

find

(a) the largest value of $(y-x)^2$,

(b) the smallest value of xy,

(c) the smallest value of $\frac{x}{y}$.

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

(b) ..... [1]

(c) ..... [1]

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9. Written as the product of their prime factors,

First integer : $2^p \times 3 \times 5^r$,
Second integer : $2 \times 3^q \times 5^4$.

The highest common factor of these two integers is $2 \times 3 \times 5^2$.
The lowest common multiple of these two integers is $2^3 \times 3 \times 5^4$.

Find the values of p, q and r.

Answer $p =$ ..... [1]

$q =$ ..... [1]

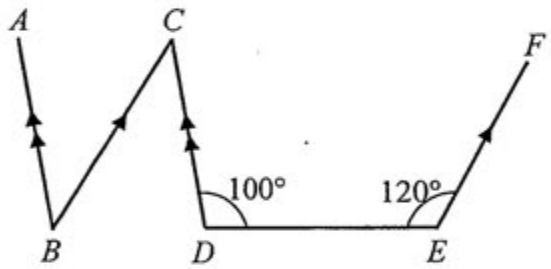
$r =$ ..... [1]

10. In the diagram, AB is parallel to CD and BC parallel to EF.
$\angle CDE = 100^\circ$ and $\angle DEF = 120^\circ$.

Find

(a) the acute angle BCD,

(b) the reflex angle ABC.



Answer (a) $\angle BCD =$ .....° [2]

(b) reflex $\angle ABC =$ .....° [1]

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11. The areas of the master bedroom, living room and kitchen of an apartment is in the ratio of $\frac{1}{4}:\frac{3}{7}:\frac{9}{28}$.

If the difference between the biggest and smallest areas is 10 m^2, find the total area of the apartment in

(a) square metres,

(b) square centimetres.

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

(b) .....cm^2 [1]

12. Solve $\frac{3x+1}{4}-\frac{x+2}{5}=2$.

Answer x =..... [3]

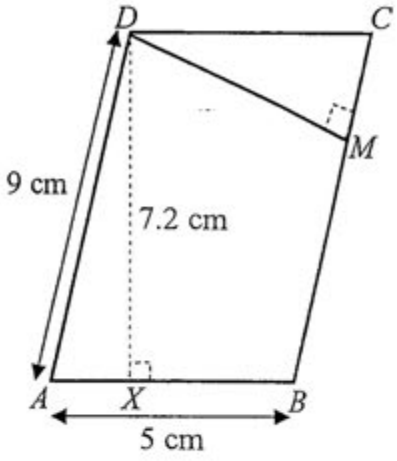
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13. The diagram below shows a parallelogram $ABCD$.
$DX = 7.2$ cm, $AB = 5$ cm and $AD = 9$ cm.
M is a point on BC such that DM is perpendicular to BC and BM is $\frac{2}{3}$ of BC.

Find

(a) the area of parallelogram $ABCD$,

(b) the area of the triangle DMC.



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

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

14. (a) Factorise completely $2ac - 6ad - bc + 3bd$.

(b) Simplify $2x + 3[4x - 2(x+1)]$.

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

(b) ..... [2]

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15. The diagram shows the point A and the line l_1.

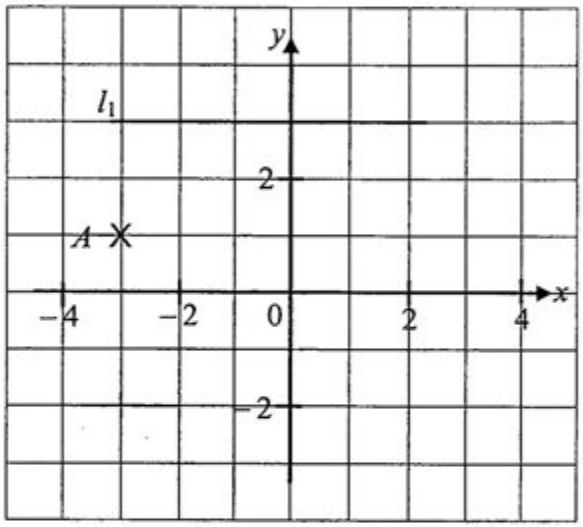
(a) Write down the coordinates of the point A.

(b) Write down the equation of the line l_1.

(c) Write down the gradient of the line l_1.

(d) A line with gradient 2 passes through point A.
On the same diagram, draw the line and label it as l_2. [1]

Answer: (d)



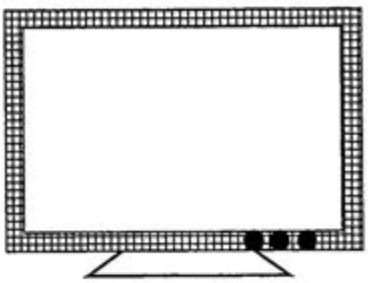
Answer (a) A =...(.....,.....)..... [1]

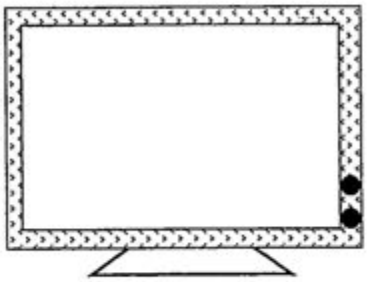
(b) ..... [1]

(c) ..... [1]

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16. During an Information Technology Fair, two different brands of televisions are on sale. The selling price of these televisions is shown below:





Soni TV Set

Usual Price: $ 2999
Promotion: 18% Discount

ViewTon TV Set

Usual Price: $ 3088
Promotion: $588 Off

(a) Find the selling price of a Soni television set.

(b) Both brands charge a 7% GST on the selling price.

(i) How much does a customer need to pay if he/she buys a ViewTon television set?

(ii) Which brand is a better buy? Justify your answer.

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

(b) (i) $..... [2]

(ii) **Soni/ViewTon** (*circle your answer*) is a better buy because .....

.....

.....

.....

.....[2]

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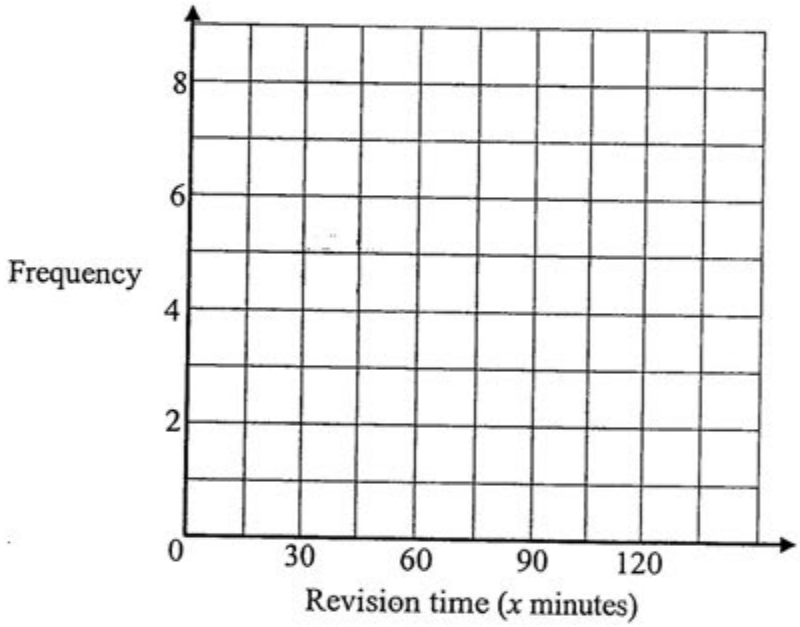
17. The table below shows the time spent (in minutes) on revision by 20 students on a particular day.

55	30	80	45	65	85	65	30	75	120
60	70	95	50	20	50	110	85	90	40

(a) Complete the frequency table in the answer space below to represent this information. [2]

Revision time (x minutes)	Tally	Frequency
$0 < x \leq 30$		
$30 < x \leq 60$	𝍸 |	
$60 < x \leq 90$		
$90 < x \leq 120$		3

(b) On the given axes, draw a histogram to illustrate this distribution. [2]



(c) State the class interval where the most number of students' revision times fall into.

(d) Find the number of students who spent more than 60 minutes on revision.

Answer (c) ..... [1]

(d) ..... [1]

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18. (a) Construct quadrilateral $PQRS$, given that $PQ = 6\,\text{cm}$, $\angle SPQ = 110°$, $SQ = 9\,\text{cm}$, $SR = 10\,\text{cm}$ and $QR = 3\,\text{cm}$. [3]

(b) On the same diagram, construct

(i) the bisector of $\angle PQR$, [1]

(ii) the perpendicular bisector of QR. [1]

(c) Point X is a point in the quadrilateral $PQRS$ that is nearer to PQ than QR. Mark a possible position for point X. [1]

Answer (a), (b) and (c):



End of paper

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HIHS End Of Year Examination 2012 Secondary One Express Mathematics Paper 1 Answers

1. (a) 137.5%
   (b) $\frac{129}{500}$

2. (a) 0.5048283909
   (b) 0.50

3. (a) 8.2°C
   (b) Japan

4. (a) $12\frac{2}{3}$
   (b) 3

5. $x > -7\frac{1}{2}$

6. 06 21 or 6.21 am

7. (a) $-\frac{\pi}{11}$
   (b) $\sqrt{9}$
   (c) $\sqrt[3]{64}$

8. (a) 121
   (b) -28
   (c) $-\frac{4}{3}$

9. $p=3$, $q=1$ and $r=2$

10. (a) 40°
    (b) 320°

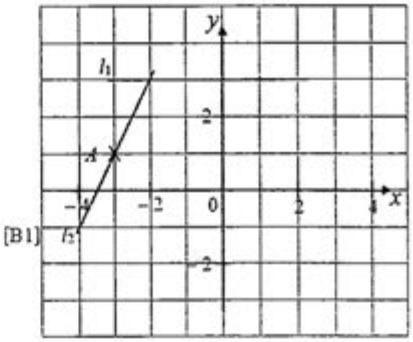
11. (a) 56 m^2
    (b) 560 000 cm^2

12. $x=3\frac{10}{11}$

13. (a) 36 cm^2
    (b) 6 cm^2

14. (a) $(2a-b)(c-3d)$
    (b) $8x-6$

15. (a) (−3,1)
    (b) $y=3$
    (c) gradient = 0

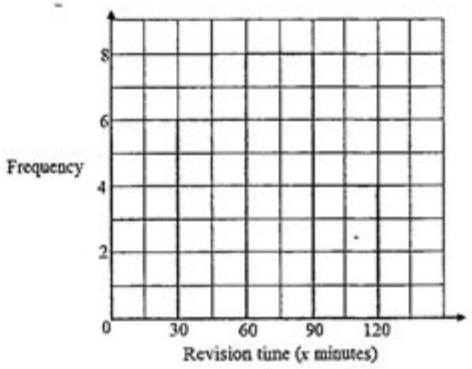


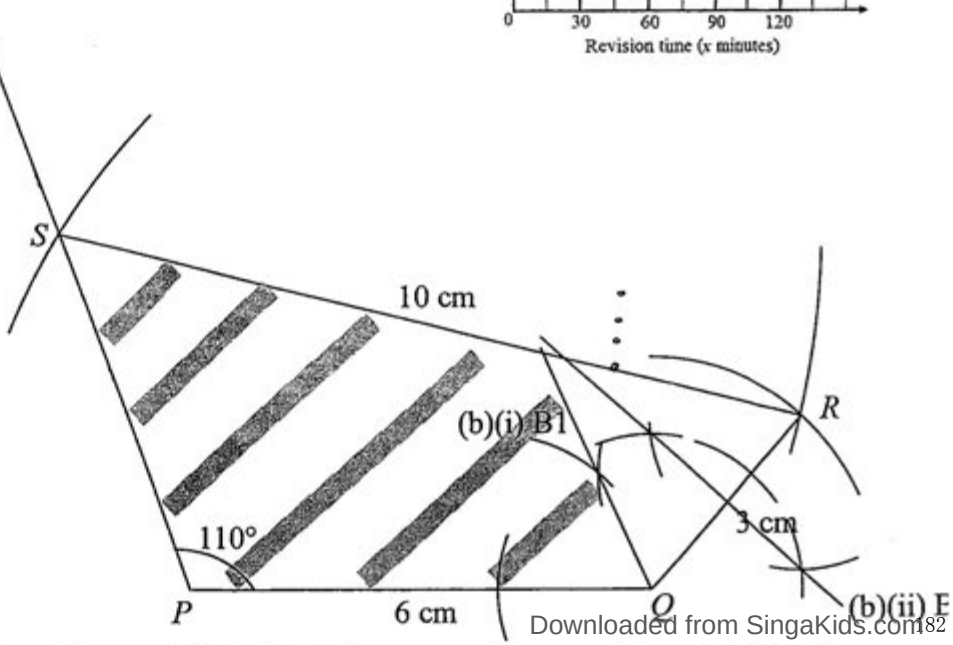
16. (a) $2459.18
    (b)(i) $2675
    (b)(ii) **Soni** is a better buy because it is **cheaper**,
    $\$2459.18 \times 1.07 = \$2631.32$

17. (a)

Revision time (x minutes)	Tally	Frequency
$0 < x \le 30$	|||	3
$30 < x \le 60$	|||| |	6
$60 < x \le 90$	|||| |||	8
$90 < x \le 120$	|||	3

(b)





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聖嬰中學
HOLY INNOCENTS' HIGH SCHOOL

END-OF-YEAR EXAMINATION 2012
SECONDARY 1 EXPRESS

MATHEMATICS **4016/02**

Paper 2

Name : _____ Date : 8 Oct 2012

Register No : _____ Duration : 1 h 30 min

Class : _____

Additional Materials needed: 4 Sheets of Writing Paper
1 Sheet of Graph Paper

Instructions to Candidates

Write your index number and name on all the work you hand in.
Write in dark 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.
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 marks for this paper is 60.

Setter: Mr Lin WeiDing

This paper consists of 8 printed pages, inclusive of this cover page.

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Answer **all** the questions

1. (a) $6x°$ and $24y°$ are a pair of complementary angles.
Find the value of $x + 4y$. [1]

(b) The table below shows the rate for the taxi fare charged by Comfort Taxi Company.

Basic Fare	Standard	Luxury
Flag-Down	\$3.00	\$5.00
Every 400 m thereafter or less up to first 10 km	\$0.25	\$0.30
Every 350 m thereafter or less after first 10 km	\$0.15	\$0.25

(i) Jayden paid \$5.75 for hiring a standard taxi.
Find the distance travelled. [2]

(ii) Keith decided to hire a luxury cab to fetch his parents from the airport.
The estimated distance of the journey is 17 km.
Calculate the taxi fare for the journey. [3]

2. Consider the number pattern.

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Line 1: $1-\frac{1}{2}=\frac{1}{2}$

Line 2: $\frac{1}{2}-\frac{1}{3}=\frac{1}{6}$

Line 3: $\frac{1}{3}-\frac{1}{4}=\frac{1}{12}$

Line 4: $\frac{1}{4}-\frac{1}{5}=\frac{1}{20}$

$\vdots$

With reference to the number pattern,

(a) write down Line 5 and Line 6. [2]

(b) write down Line n. [1]

(c) find the integers of a and b where $\frac{1}{a}-\frac{1}{b}=\frac{1}{210}$. [1]

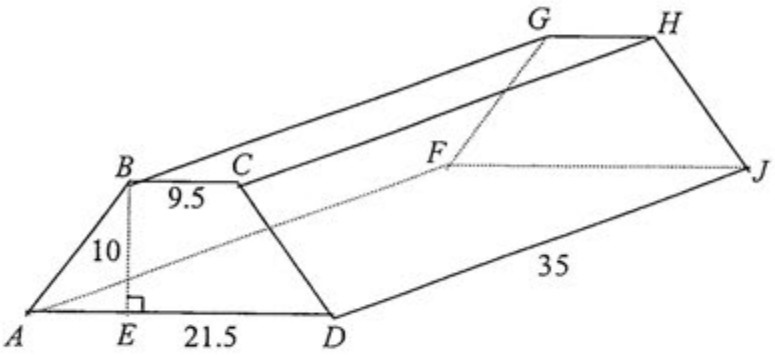
(d) find the following sum without the use of a calculator [2]

$\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+....+\frac{1}{210}$.

3. The diagram shows a solid prism whose cross-section is a trapezium $ABCD$.

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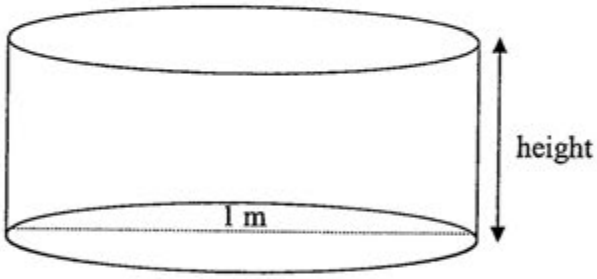
$BE = 10$ cm, $BC = 9.5$ cm, $AD = 21.5$ cm and $DJ = 35$ cm.
BC is parallel to AD.
Give your answers to 3 significant figures.



(a) Find the area of trapezium $ABCD$. [1]

(b) Hence find the volume of the prism. [1]

50 of such prisms will be melted and poured into an open cylindrical tank with a diameter of 1 m, as shown in the diagram below.



Take $\pi = 3.142$.

(c) If the melted prisms could fill the tank completely, find the height of the tank. [2]

(d) The external surface of the tank will be coated with a protective layer. Find the area of this protective layer. [2]

4. (a) Two of the interior angles of a pentagon are each $(x+80)°$.
One of them is $(3x+10)°$ while the remaining interior angles are $110°$ each.

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Find the value of x. [2]

(b) The diagram shows three sides AB, BC and CD of a regular polygon. $\angle CDB = 18°$.

(i) Find the exterior angle of the polygon. [2]

(ii) Calculate the number of sides of the polygon. [1]



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

Water leaks out of a tank at a constant rate.
The volume of water V litres left in the tank after t minutes is given by the equation $V = -\frac{4}{3}t + 16$ for $0 \le t \le 12$.

The table below shows some of the corresponding values of V and t.

t	0	3	6	12
V	16	p	8	0

(a) Find the value of p. [1]

(b) Using a scale of 1 cm to represent 1 unit on each axis, draw a horizontal t-axis for $0 \le t \le 12$ and a vertical V-axis for $0 \le V \le 16$.

On your axes, draw the graph of $V = -\frac{4}{3}t + 16$ for $0 \le t \le 12$. [3]

(c) Using your graph, find the time at which the tank is $\frac{1}{4}$ filled. [1]

(d) On the same axes, draw and label the graph of $V = 9.6$.
Write down the coordinates of the point of intersection of the two graphs. [2]

6. The table below shows the population of different countries around the world in 2011.

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Country	Population (estimated)
Switzerland	8,000,000
Laos	6,500,000
Singapore	5,183,700

(a) Write down the population of Singapore in millions.
Give your answer correct to 2 significant figures. [1]

(b) Express Singapore's population as a percentage of Switzerland's population.
Give your answer correct to 3 significant figures. [2]

(c) Given that Laos account for 0.09% of the world's population, estimate the world's population in 2011.
Express your answer in millions, correct to 1 significant figure. [2]

(d) In the year 2010, the population of Singapore was estimated to be 5,076,700.
Calculate the percentage increase in Singapore's population from 2010 to 2011. [2]

---

7. A plane is scheduled for a 3206 km flight from Taiwan to Singapore.
The expected timing for the flight is $4\frac{1}{2}$ hours.
During the actual flight, the plane travelled at 648 km/h for 70 minutes before encountering turbulence.
It was forced to land in Hong Kong without making any detours.

(a) Calculate the distance between Taiwan and Hong Kong. [1]

The plane departed Hong Kong airport 35 minutes later and continued the remaining journey back to Singapore at a speed of 700 km/h.

(b) Find the time taken for the remaining journey back to Singapore. [2]

(c) Find the average speed of the entire journey.
Give your answer to 3 significant figures. [2]

(d) If the plane had to reach Singapore within the expected timing of $4\frac{1}{2}$ hours, find the average speed at which the plane must travel from Hong Kong to Singapore. Give your answer to the nearest km/h. [2]

8. Jaclyn was given a fixed sum of money to buy stationeries as prizes for her students.
With the sum of money, she can choose to buy m pencils at a price of 2 for \$3.50.
Alternatively, she can buy $(m+1)$ markers at \$1.50 each.

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(a) Write down an expression in terms of m for the amount of money spent, in cents, if

(i) Jaclyn bought the pencils. [1]

(ii) Jaclyn bought the markers. [1]

It was given that if Jaclyn had bought the markers, she would have saved \$2.00.

(b) Form an algebraic equation in terms of m. [1]

(c) Solve the equation. [2]

(d) Find the sum of money, in dollars, given to Jaclyn. [1]

(e) Jaclyn decided to buy n erasers instead.
Given that 3 erasers cost \$1.00 and that Jaclyn must not spend more than the sum of money given, form an inequality and find the maximum number of erasers that Jaclyn could buy. [2]

9. The diagram below (not drawn to scale) shows the diagram of a medal plaque.
The plaque consists of a circle with center O, a uniform circular ring with center B and a triangle OFG.
$AOE = 16$ cm, $BC = 2$ cm, $DF = 5.5$ cm and $DE = 3.5$ cm.

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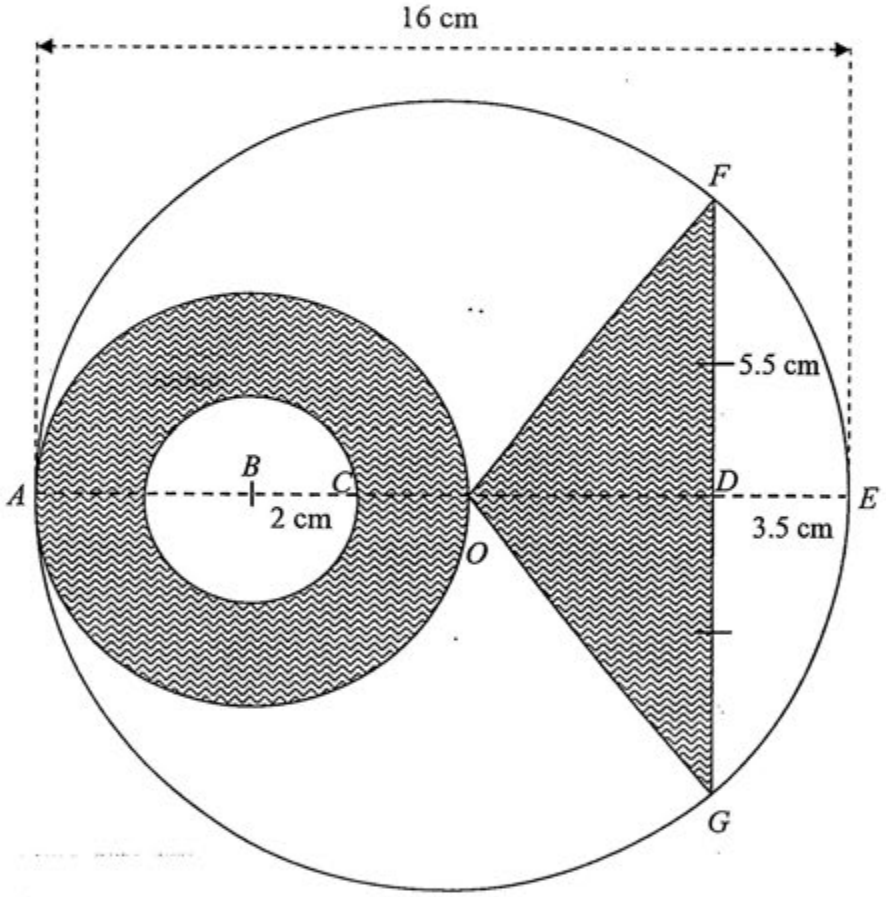
Take $\pi = 3.142$. Give your answers to 3 significant figures.

(a) Show that the height of triangle *OFG*, *OD* is 4.5 cm. [1]

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

(c) Find the area of the unshaded region on the plaque. [3]

(d) The shaded region will be painted with gold paint which cost \$1.80 per cm^2. The unshaded region will be painted with silver paint which cost \$1.20 per cm^2.
Find the cost of painting this plaque. [2]



-End-of-Paper-

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End of Year Exam 2012
Secondary 1 Express Mathematics Paper 2
Answer Key

1	(a)	$x+4y=15$	7	(a)	756 km
	(b)	4.4km		(b)	$3\frac{1}{2}$ *hrs*
	(b)(ii)	$17.50		(c)	611 *km/h*
2	(a)	Line 5: $\frac{1}{5}-\frac{1}{6}=\frac{1}{30}$ Line 6: $\frac{1}{6}-\frac{1}{7}=\frac{1}{42}$		(d)	891 *km/h*
	(b)	*n*th line: $\frac{1}{n}-\frac{1}{n+1}=\frac{1}{n(n+1)}$	8	(a)(i)	$(175m)$ cents
	(c)	Value of a = 14 Value of b = 15		(a)(ii)	$(150m+150)$ cents
	(d)	Sum = $\frac{14}{15}$		(b)	$175m=(150m+150)+200$ Or $175m-(150m+150)=200$
3	(a)	155 cm^2		(c)	$m=14$
	(b)	5430 cm^3		(d)	$24.50
	(c)	$h=34.5cm$		(e)	73
	(d)	18700 cm^2	9	(a)	$4.5cm$
4	(a)	$x=30$		(b)	$64.7cm$
	(bi)	36°		(c)	$139cm^2$
	(bii)	10 sides		(d)	$279
5		Refer to graph paper attached			
6	(a)	5.2 million			
	(b)	64.8 %			
	(c)	7000 millions			
	(d)	2.11 %			

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聖嬰中學
HOLY INNOCENTS' HIGH SCHOOL

END-OF-YEAR EXAMINATION 2012
SECONDARY 1 EXPRESS

MATHEMATICS **4016/01**

Paper 1

Name : _____ Date : 11 October 2012

Register No : _____ Duration : 1 h 30 min

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Answer all the questions

1. (a) Express $1\frac{3}{8}$ as a percentage.

(b) Express 25.8% as a fraction in its simplest form.

Solutions:

(a) 137.5% ------ [B1]

(b) $\frac{129}{500}$ ------ [B1]

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

(b) ..... [1]

2. (a) Calculate $\frac{4.5^2}{\sqrt{69.1}+31.8}$, showing all the figures on your calculator display.

(b) Give your answer correct to 2 significant figures.

Solutions:

(a) 0.5048283909 ------ [B1]

(b) 0.50 ------ [B1]

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

(b) ..... [1]

3.

	Japan	Singapore	Iceland
Highest	18°C	33°C	−1°C
Lowest	−1°C	24°C	−9.2°C

The table shows the highest and lowest temperatures on a particular day in Japan, Singapore and Iceland.

Find

(a) the difference between the highest and lowest temperature in Iceland,

(b) the country with the largest temperature difference on that day.

Solutions:

(a) 8.2°C ------ [B1]

(b) Japan ------ [B1]

Answer (a) ..... °C [1]

(b) ..... [1]

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4. Given that $m = -2$ and $n = 3$, evaluate

(a) $\frac{1}{3}(2m - 7mn)$,

(b) $\sqrt[3]{m^2n + 5n}$.

Solutions:

(a) $\frac{1}{3}(2(-2) - 7(-2)(3)) = 12\frac{2}{3}$ ------ [B1]

(b) $\sqrt[3]{(-2)^2(3) + 5(3)} = 3$ ------ [B1]

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

(b) ..... [1]

5. Solve $5(6 + x) - x > 0$.

Solutions:

$30 + 5x - x > 0$

$30 + 4x > 0$ ------ [M1]

$4x > -30$

$x > -7\frac{1}{2}$ ------ [A1]

Answer ..... [2]

6. Three different lights flash at regular intervals.
The red, orange and green light flashes every 15 seconds, 21 seconds and 36 seconds respectively.
The three lights flash together at 06 00.

At what time do they next flash together?

Solutions:

$15 = 3 \times 5$
$21 = 3 \times 7$
$36 = 2^2 \times 3^2$
} M1

L.C.M. $= 2^2 \times 3^2 \times 5 \times 7$
$= 1260$ seconds
$= 21$ minutes
} M1

Time = 06 21 or 6.21 am ------ [A1]

Answer ..... [3]

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7. Consider the numbers below

$$-\frac{\pi}{11},\quad 4.718,\quad \frac{21}{37},\quad \sqrt{9},\quad \sqrt[3]{64}.$$

Write down

(a) the irrational number(s),

(b) the prime number(s),

(c) the perfect square number(s).

Solutions:

(a) $-\frac{\pi}{11}$ ------ [B1]

(b) $\sqrt{9}$ ------ [B1]

(c) $\sqrt[3]{64}$ ------ [B1]

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

(b) ..... [1]

(c) ..... [1]

8. Given $-4 \le x \le 2$ and $3 \le y \le 7$,

find

(a) the largest value of $(y-x)^2$,

(b) the smallest value of xy,

(c) the smallest value of $\frac{x}{y}$.

Solutions:

(a) largest value of $(y-x)^2 = (7-(-4))^2$
$= 121$ ------ [B1]

(b) smallest value of $xy = 7(-4)$
$= -28$ ------ [B1]

(c) smallest value of $\frac{x}{y} = -\frac{4}{3}$ ------ [B1]

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

(b) ..... [1]

(c) ..... [1]

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9. Written as the product of their prime factors,

First integer : $2^p \times 3 \times 5^r$,
Second integer : $2 \times 3^q \times 5^4$.

The highest common factor of these two integers is $2 \times 3 \times 5^2$.
The lowest common multiple of these two integers is $2^3 \times 3 \times 5^4$

Find the values of p, q and r.

Solutions:

$p = 3$ ------ [B1]
$q = 1$ ------ [B1]
$r = 2$ ------ [B1]

Answer $p =$ ..... [1]

$q =$ ..... [1]

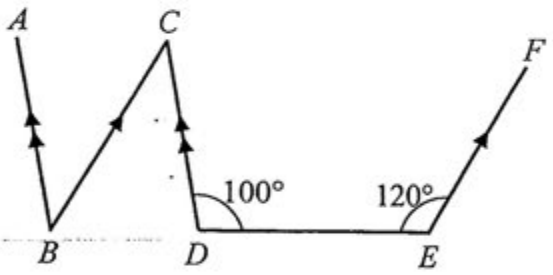
$r =$ ..... [1]

10. In the diagram, AB is parallel to CD and BC parallel to EF.
$\angle CDE = 100^\circ$ and $\angle DEF = 120^\circ$.

Find

(a) the acute angle BCD,

(b) the reflex angle ABC.



Solutions:

(a) $\angle CBD = 60^\circ$ (interior angles) ------ [M1]
$\angle BCD = 100^\circ - 60^\circ$ (ext. angle of triangle)
$= 40^\circ$ ------ [A1]

(b) $\angle ABC = 40^\circ$ (alternate angle)
Reflect angle $\angle ABC = 360^\circ - 40^\circ = 320^\circ$ (angles at a point) ------ [B1]

Answer (a) $\angle BCD =$ .....° [2]

(b) reflex $\angle ABC =$ .....° [1]

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11. The areas of the master bedroom, living room and kitchen of an apartment is in the ratio of $\frac{1}{4}:\frac{3}{7}:\frac{9}{28}$.

If the difference between the biggest and smallest areas is 10 m^2, find the total area of the apartment in

(a) square metres,

(b) square centimetres.

Solutions:

(a) $\frac{1}{4}:\frac{3}{7}:\frac{9}{28}=\frac{7}{28}:\frac{12}{28}:\frac{9}{28}$ ------ [M1]

Total area $=\frac{10}{5}\times 28$

$= 56\ m^2$ ------ [A1]

(b) Total area $= 56\times 100\times 100$

$= 560\ 000\ cm^2$ ------ [B1]

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

(b) .....cm^2 [1]

12. Solve $\frac{3x+1}{4}-\frac{x+2}{5}=2$.

Solutions:

$\frac{15x+5-4x-8}{20}=2$ ------ [M1]

$\frac{11x-3}{20}=2$

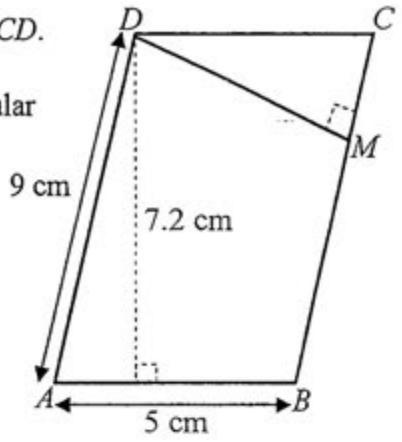
$11x-3=40$ ------ [M1]

$x=3\frac{10}{11}$ ------ [A1]

Answer x =..... [3]

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13. The diagram below shows a parallelogram $ABCD$.
$DX = 7.2$ cm, $AB = 5$ cm and $AD = 9$ cm.
M is a point on BC such that DM is perpendicular to BC and BM is $\frac{2}{3}$ of BC.
DM is perpendicular to BC.



Find

(a) the area of parallelogram $ABCD$,

(b) the area of the triangle DMC.

Solutions:

(a) area of parallelogram $ABCD$
$= 5 \times 7.2$
$= 36\,\text{cm}^2$ ------ [B1]

(b) height of triangle
$= 36 \div 9$
$= 4$ cm ------ [M1]

area of the triangle DMC
$= \frac{1}{2} \times 3 \times 4$
$= 6\,\text{cm}^2$ ------ [A1]

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

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

14. (a) Factorise completely $2ac - 6ad - bc + 3bd$.

(b) Simplify $2x + 3[4x - 2(x+1)]$.

Solutions:

(a) $2ac - 6ad - bc + 3bd = 2a(c-3d) - b(c-3d)$ ------ [M1]
$= (2a-b)(c-3d)$ ------ [A1]

(b) $2x + 3[4x - 2(x+1)] = 2x + 3(4x - 2x - 2)$ ------ [M1, expansion]
$= 8x - 6$ ------ [A1]

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

(b) ..... [2]

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15. The diagram shows the point A and the line l_1.

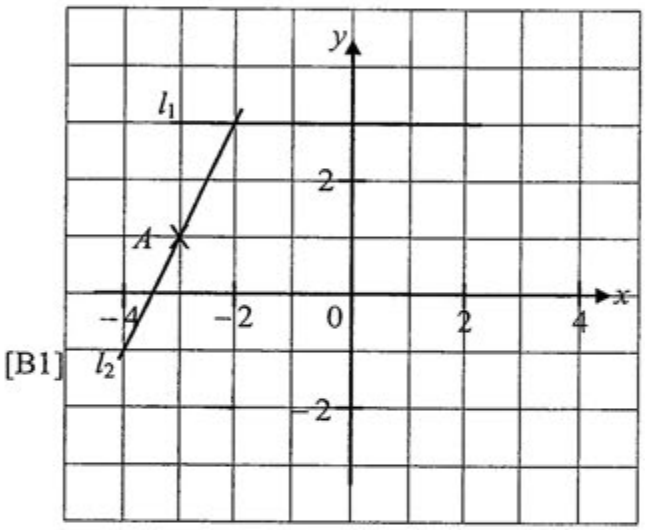
(a) Write down the coordinates of the point A.

(b) Write down the equation of the line l_1.

(c) Write down the gradient of the line l_1.

(d) A line with gradient 2 passes through point A.
On the same diagram, draw the line and label it as l_2. [1]

Answer: (d)



Solutions:

(a) (−3,1) ------ [B1]

(b) $y = 3$ ------ [B1]

(c) gradient = 0 ------ [B1]

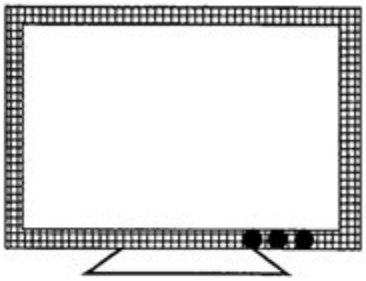
Answer (a) .....(.....,.....)..... [1]

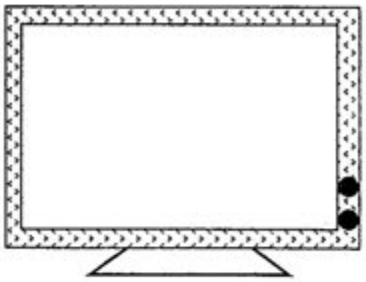
(b) ..... [1]

(c) ..... [1]

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16. During an Information Technology Fair, two different brands of televisions are on sale. The selling price of these televisions is shown below:





Soni TV Set	**ViewTon TV Set**
Usual Price: \$ 2999 Promotion: 18% Discount	Usual Price: \$ 3088 Promotion: \$588 Off

(a) Find the selling price of a Soni television set.

(b) ·· Both brands charge a 7% GST on the selling price.

(i) How much does a customer need to pay if he/she buys a ViewTon television set?

(ii) Which brand is a better buy? Justify your answer.

Solutions:

(a) selling price = $\$2999 \times 0.82$ ------ [M1]
= \$2459.18 ------ [A1]

(b) (i) amount to be paid = $\$(3088 - 588) \times 1.07$ ------ [M1]
= \$2675 ------ [A1]

(ii) **Soni** [A1]is a better buy because it is **cheaper**,
$\$2459.18 \times 1.07 = \$2631.32$
[M1, show using either the selling price with or without GST].
Note: answers and working need to be written on the answer space provided.

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

(b) (i) \$..... [2]

(ii) **Soni/ViewTon** (*circle your answer*) is a better buy because .....

.....

.....

.....

.....[2]

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17. The table below shows the time spent (in minutes) on revision by 20 students on a particular day.

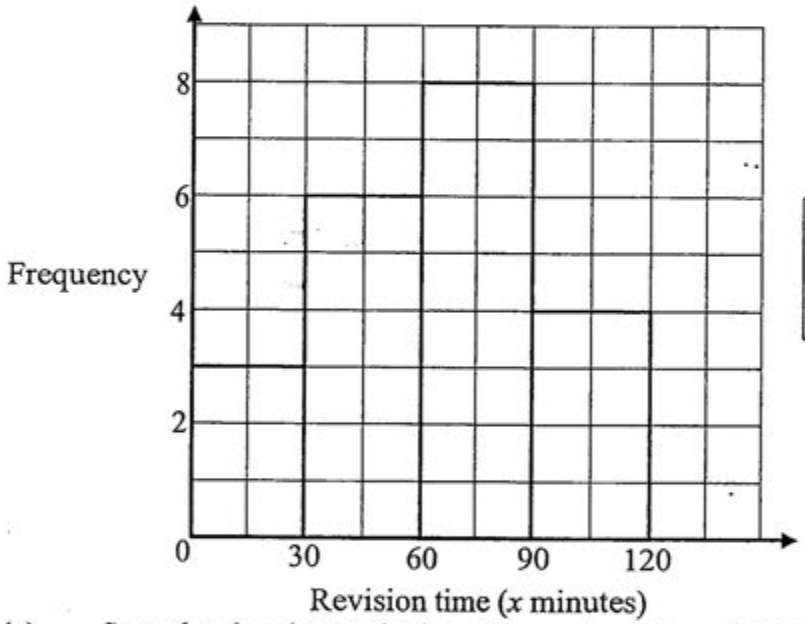
55	30	80	45	65	85	65	30	75	120
60	70	95	50	20	50	110	85	90	40

(a) Complete the frequency table in the answer space below to represent this information. [2]

Revision time (x minutes)	Tally	Frequency
$0 < x \leq 30$	|||	3
$30 < x \leq 60$	𝍸 |	6
$60 < x \leq 90$	𝍸 |||	8
$90 < x \leq 120$	|||	3

[B1 for tally, B1 for Frequency]

(b) On the given axes, draw a histogram to illustrate this distribution. [2]



[B2, minus 1 mark for 1 mistake]

(c) State the class interval where the most number of students spent their revision on.

(d) Find the number of students who spent more than 60 minutes on revision.

Solutions:

(c) $60 < x \leq 90$ ------ [B1]

(d) 11 ------ [B1]

Answer (c) ..... [1]

(d) ..... [1]

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18. (a) Construct quadrilateral $PQRS$, given that $PQ = 6$ cm, $\angle SPQ = 110°$, $SQ = 9$ cm, $SR = 10$ cm and $QR = 3$ cm. [3]

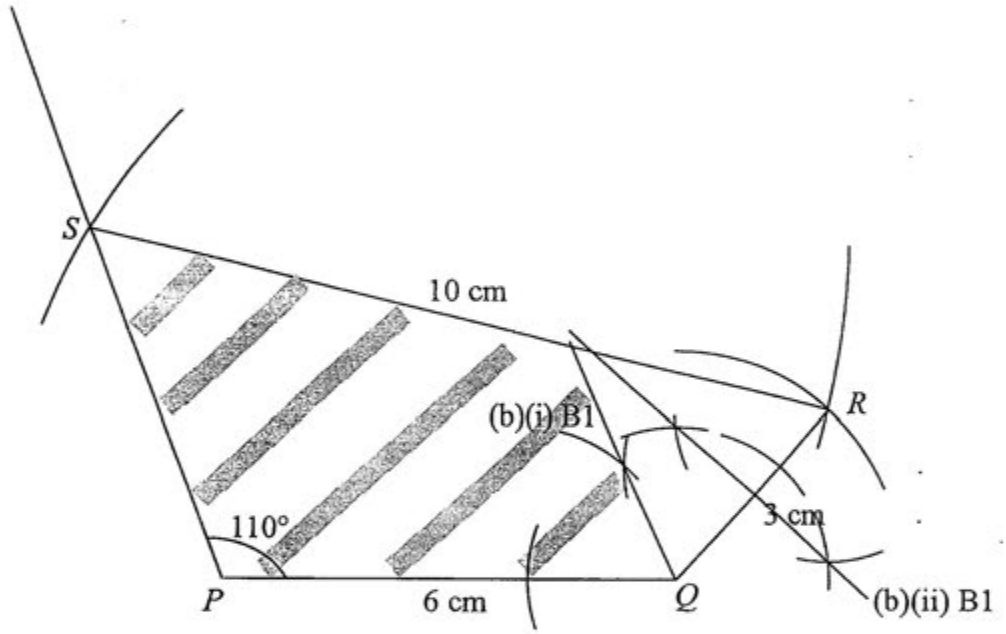
(b) On the same diagram, construct

(i) the bisector of $\angle PQR$, [1]

(ii) the perpendicular bisector of QR. [1]

(c) Point X is a point in the quadrilateral $PQRS$ that is nearer to PQ than QR. Mark a possible position for point X. [1]

Answer (a), (b) and (c):



Solutions:

(a) B1, correct angle

B2, correct construction of all length, minus 1 mark for every mistake or no labeling of dimension/vertexes.

(b) must show the arcs.

(c) Mark any point inside the shaded region except on the bisector.

End of paper

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Answer Scheme to 2012 Sec 1 Express EOY Mathematics Paper 2

No.	Answer	Marks	Remarks
1(a)	$6x^\circ + 24y^\circ = 90^\circ$ (Divide by 6 throughout) $x + 4y = 15$	B1	
1(bi)	Fare exclusive of flag-down = \$5.75 - \$3.00 = \$2.75 Distance travelled $= \frac{\$2.75}{\$0.25} \times 400m$ $= 4400m$ or $4.4km$	M1 A1	
1b(ii)	Flag down fare = \$5.00 Fare up to $10km = \frac{10km}{400m} \times \$0.30$ = \$7.50 Fare incurred after $10km$ to remaining $17km$ $= \frac{7km}{350m} \times \$0.25$ = \$5.00 Total Fare = \$5.00 + \$7.50 + \$5.00 = \$17.50	M1 M1 A1	
2(a)	Line 5: $\frac{1}{5} - \frac{1}{6} = \frac{1}{30}$ Line 6: $\frac{1}{6} - \frac{1}{7} = \frac{1}{42}$	B1 B1	
2(b)	Line n: $\frac{1}{n} - \frac{1}{n+1} = \frac{1}{n(n+1)}$	B1	

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2(c)	$\frac{1}{210}=\frac{1}{14(15)}$ $\therefore n=14$ $\frac{1}{14}-\frac{1}{15}=\frac{1}{210}$ Required Fraction $=\frac{1}{14}-\frac{1}{15}$ Values of a and b are 14 and 15 respectively.	 B1	
2(d)	Line 1: $1-\frac{1}{2}$ Line 2: $\frac{1}{2}-\frac{1}{3}$ Line 3: $\frac{1}{3}-\frac{1}{4}$ Line 4: $\frac{1}{4}-\frac{1}{5}$ Line 5: $\frac{1}{5}-\frac{1}{6}$ Line 6: $\frac{1}{6}-\frac{1}{7}$ ..... Line14: $\frac{1}{14}-\frac{1}{15}$ Sum of $\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+....+\frac{1}{210}=1-\frac{1}{15}$ $=\frac{14}{15}$	 M1 A1	
3(a)	Area of Trapezium ABCD $=\frac{1}{2}\times(9.5+21.5)\times10$ $=155\ \text{cm}^2$	 B1	

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3(b)	Volume of one trapezoidal prism $= 155 \times 35$ $= 5425\ cm^3$ $= 5430\ cm^3$ (Correct to 3 significant figures)	B1	
3(c)	Volume of melted strips $= 50 \times 5425$ $= 271250 cm^3$ $\pi(50)^2(h) = 271250$ $h = \frac{271250}{\pi(50)^2}$ $h = \frac{271250}{3.142(50)^2}$ $h = 34.532$ $h = 34.5cm$ (Correct to 3 significant figures)	M1 A1	
3(d)	Area un-contacted with protective area $= \pi(50)^2 + 2\pi(50)(34.532)$ $= (3.142)(50)^2 + 2(3.142)(50)(34.532)$ $= 18704.9544$ $= 18700\ cm^2$ (Correct to 3 significant figures)	M1 A1	
4(a)	Sum of the interior angles of a pentagon $= (5-2) \times 180°$ $= 540°$ $\therefore 2(x+80)° + (3x+10)° + 2(110°) = 540°$ $2x + 160° + 3x + 10° + 220° = 540°$ $5x = 150°$ $x = 30°$ Value of $x = 30$	 M1 A1	
4(bi)	$BC = CD$ (sides of regular polygon) $\angle CBD = \angle CDB$ (base $\angle$s of isos.Δ) $= 18°$ $\angle BCD = 180° - \angle CBD - \angle CDB$ ($\angle$ sum of Δ) $= 180° - 18° - 18°$ $= 144°$ An exterior angle of the polygon $= 180 - 144$ $= 36°$	 M1 A1	<u>Alternative Method</u> Exterior angle of polygon $= 18° + 18°$ [M1] $= 36°$ [A1]

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4(bii)	Sum of interior angles of the polygon $= (n-2)\times 180°$ Each interior angle of the polygon $= \left[\frac{180(n-2)}{n}\right]°$ $\therefore \frac{180(n-2)}{n} = 144$ $180n - 360 = 144n$ $180n - 144n = 360$ $36n = 360$ $n = \frac{360}{36}$ $= 10$ $\therefore$ The polygon has 10 sides.	B1	Alternative Method Total exterior angles of polygon $= 360°$ Number of sides $= \frac{360}{36}$ $= 10$ [B1]
5	Refer to graph paper attached.		
6(a)	Singapore's Population = 5.2 million (correct to 2 significant figures)	B1	
6(b)	Required Percentage $= \frac{5183700}{8000000}\times 100\%$ $= 64.796$ = 64.8% (correct to 3 significant figures)	M1 A1	
6(c)	0.09% represent 6.5 million 1% represent $\frac{6.5}{0.09}$ million World's population $= \frac{6.5}{0.09}\times 100\%$ $= 7222.22$ = 7000 million	M1 A1	
6(d)	Increase in population $= 5183700 - 5076700$ $= 107000$ Percentage Increase In Population $= \frac{107000}{5076700}\times 100\%$ $= 2.1076$ = 2.11%	M1 A1	Award M1 for 5076700 seen.

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7(a)	Distance from Taiwan to Hong Kong $= 648 \times \frac{70}{60}$ $= 756\ km$	B1	
7(b)	Distance for remaining journey $= 3206 - 756$ $= 2450\ km$ Time taken for remaining journey $= \frac{2450}{700}$ $= 3\frac{1}{2}\ hrs$	M1 A1	
7(c)	Total distance $= 3206\ km$ Total Time $= 1\frac{1}{6} + \frac{35}{60} + 3\frac{1}{2}$ $= 5\frac{1}{4}\ hrs$ Average speed for the entire journey $= \frac{3206}{5\frac{1}{4}}$ $= 610.66$ $= 611\ km/h$ (correct to 3 significant figures)	M1 A1	
7(d)	Remaining Distance $= 2450\ km$ Allowed Time $= 4\frac{1}{2} - 1\frac{1}{6} - \frac{35}{60}$ $= 2\frac{3}{4}\ hrs$ Average speed to travel $= \frac{2450}{2\frac{3}{4}}$ $= 890.90$ $= 891\ km/h$ (correct to nearest km/h)	M1 A1	

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8(ai)	Amount spent buying pencils $= (175m)$ cents	B1	Alternative Method Amount spent buying pencils $= (\frac{350}{2}m)$ cents [B1]
8(aii)	Amount spent buying markers $= [(m+1)150]$ $= (150m+150)$ cents	B1	
8(b)	$175m = (150m+150)+200$	B1	Alternative Method $\frac{350}{2}m = (150m+150)+200$ Award B1 Or $175m-(150m+150) = 200$ Award B1
8(c)	$175m = 150m+150+200$ $25m = 350$ $m = 14$	M1 A1	Alternative Method $\frac{350}{2}m = (150m+150)+200$ $350m = 300m+300+40$ $50m = 700$ $m = 14$
8(d)	Budget allocated $= \frac{350}{2}m$ $= \frac{350}{2}(14)$ $= 2450$ $= \$24.50$	B1	

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8(e)	$\frac{100}{3}n \le 2450$ $n \le 73.5$ Maximum number of erasers = 73	M1 A1	
9(a)	Height of triangle *OFG*, $OD = \frac{16}{2} - 3.5$ $= 4.5cm$ (Shown)	B1	
9(b)	Circumference of circular ring figure $= 2\pi(2) + 2\pi(\frac{8}{2})$ $= 2(3.142)(2) + 2(3.142)(\frac{8}{2})$ $= 12.568 + 25.136$ $= 37.70$ $= 37.7cm$ Perimeter of shaded region $= 37.70 + 2(8) + 2(5.5)$ $= 64.7cm$	M1 A1	

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9(c)	Area of shaded circular ring figure $= \pi(\frac{8}{2})^2 - \pi(2)^2$ $= 3.142(\frac{8}{2})^2 - 3.142(2)^2$ $= 50.272 - 12.568$ $= 37.704$ $= 37.7cm^2$ Area of shaded region $= 37.704 + (\frac{1}{2} \times 4.5 \times 11)$ $= 37.704 + 24.75$ $= 62.454$ $= 62.5cm^2$ Area of unshaded region $= \pi(8)^2 - 62.454$ $= 3.142(8)^2 - 62.454$ $= 201.088 - 62.454$ $= 138.634$ $= 139cm^2$	M1 M1 A1	
9(d)	Total cost of making the pendant $= 62.454(1.80) + 138.63(1.20)$ $= 112.4172 + 166.356$ $= 278.7732$ = \$279 (correct to nearest dollars)	M1 A1	

- End of Marking Scheme -

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