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DUNEARN SECONDARY SCHOOL
End of Year Examination 2012
Mathematics
Paper 1

Secondary 1 Express

Wednesday **10th Oct 2012** **0800 - 0900 hrs** **1 hour**

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number in the spaces at the top of this page.
Answer **all** questions.
Write your answers on the spaces provided.
Show your working clearly on the space provided. Omission of essential working will result in loss of marks.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
You should not spend too much time on any one question.
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 3.142 unless the question requires the answer in terms of π or otherwise.

ELECTRONIC CALCULATORS MAY BE USED IN THIS PAPER.

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Setter: Mdm Chia Yee Ping

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Answer **all** the questions.

1 Express 23.04985 correct to

(a) three significant figures,

(b) three decimal places.

Answer (a) _____ [1]

(b) _____ [1]

2 By correcting each number in the expression to 2 significant figures,

estimate the value of $\dfrac{5.0356\times\sqrt{15.798}}{9.675\times 2.026}$

Answer _____ [2]

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3 **(a)** Find the fraction that is exactly between $\frac{4}{7}$ and $\frac{5}{7}$, in its simplest form.

(b) Express $2\frac{10}{11}$ as a recurring decimal.

Answer (a) _____ [1]

(b) _____ [1]

4 **(a)** A rescue plane 105m above sea level detects a sunken ship 28m below sea level. How far apart are the rescue plane and the sunken ship?

(b) Calculate $[3\times(-5)-6]\div[4-(-6)\div 2]$, showing all relevant workings.

Answer (a) _____ m [1]

(b) _____ [2]

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5 **(a)** Solve the inequality $3x+7 \leq 22-2x$.

(b) If $-13 < a < 5$ and $-7 < b < 8$ and a and b are integers, find

(i) the smallest value of ab,

(ii) the greatest value of ab.

Answer (a) $x \leq$ _____ [2]

(b) (i) _____ [1]

(ii) _____ [1]

6 **(a)** Given that $T = \dfrac{2g^2 - 5h}{4h}$, calculate the value of T when $g = 5$ and $h = -2$.

(b) Expand and simplify $2(3x - 4y) + 13y$.

Answer (a) _____ [2]

(b) _____ [2]

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7 The number 1800, written as a product of its prime factors, is $2^3 \times 3^2 \times 5^2$.

(a) Express 252 as the product of its prime factors.

(b) Hence find

(i) the greatest integer that will divide both 1800 and 252 exactly,

(ii) the smallest value of y such that $252y$ is a multiple of 1800.

Answer (a) _____ [1]

(b) (i) _____ [1]

(ii) $y =$ _____ [2]

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8 **(a)** Factorise $2ab-8a-3bc+12c$ completely.

(b) **(i)** Factorise $pq-kq$.

(ii) Hence, find the value of $1560\times 42-1660\times 42$ without the use of a calculator.

Answer (a) _____ [2]

(b) (i) _____ [1]

(ii) _____ [1]

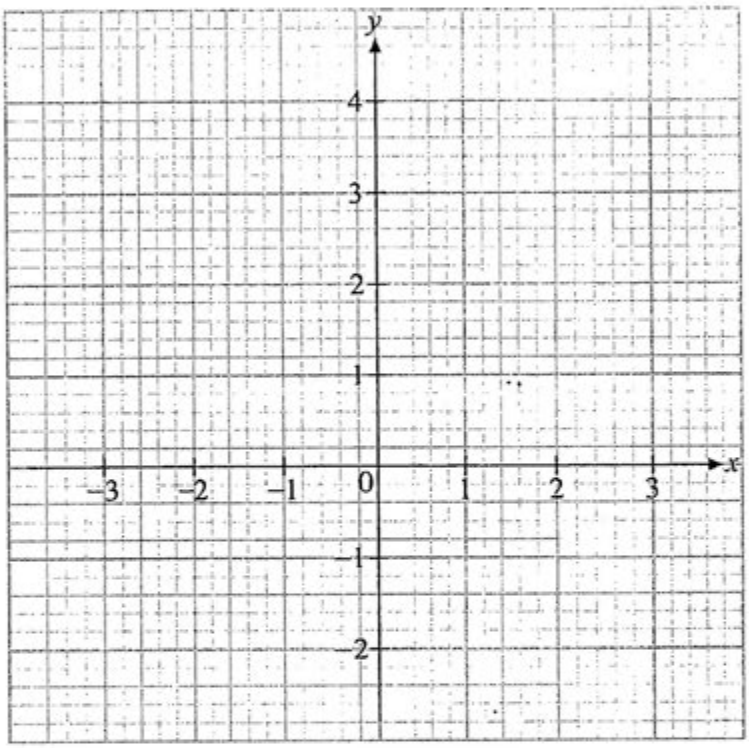
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9 **(a)** Plot and label the coordinates $A(1,2)$, $B(-3,2)$, $C(-1,-1)$ on the grid below.

(b) Find the gradient of the line BC.

(c) Write down the coordinates of D if $ABCD$ forms a parallelogram.

(d) Calculate the area of the parallelogram $ABCD$.



Answer (a) _____ [1]

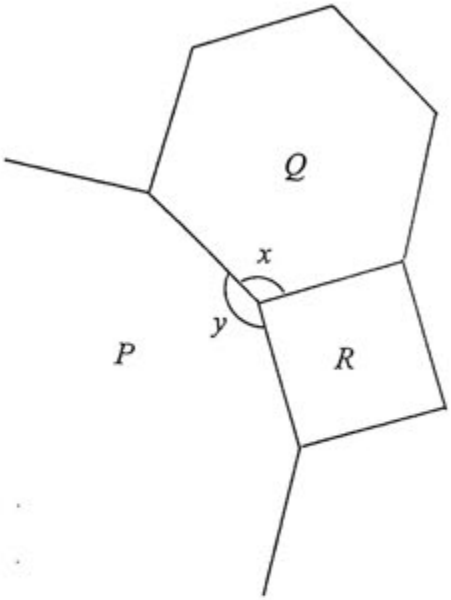
(b) _____ [1]

(c) $D =$ (_____ , _____) [1]

(d) _____ units^2 [1]

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10 The diagram below shows a square R, a regular hexagon Q and a regular n-sided polygon P that are joined together.



(a) Find the values of

(i) x,

(ii) y.

(b) Hence, find n, the number of sides of the polygon P.

Answer (a) (i) $x =$ _____ ° [2]

(ii) $y =$ _____ ° [1]

(b) $n =$ _____ [2]

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11 The diagram below shows the patterns formed by dots.

Diagram number, n	$n=1$	$n=2$	$n=3$	$n=4$
				
Total number of dots	4	7	10	

(a) On the answer space below, draw diagram number 4 of the sequence and write down the number of dots needed.

(b) **(i)** Based on the information given in the diagram above, generate the general term, T_n. Show your workings.

(ii) Using the general term, T_n, calculate the total number of dots in the 98^{th} pattern.

(iii) Given that the nth pattern contains a total number of 1957 dots, calculate the value of n.

Answer (a) _____ [1]

(b) (i) $T_n =$ _____ [2]

(ii) _____ [1]

(iii) $n =$ _____ [2]

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Name :	Class	Register Number

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DUNEARN SECONDARY SCHOOL

End of Year Examination 2012

Mathematics

Paper 2

Secondary 1 Express

Wednesday **3rd Oct 2012** **0800 - 0930 hrs** **1 hour 30 min**

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number in the spaces at the top of this page.
Answer **all** questions.
Write your answers on the writing paper provided.
Show your workings clearly. Omission of working will result in loss of marks.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
You should not spend too much time on any one question.
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 3.142 unless the question requires the answer in terms of π or otherwise.

ELECTRONIC CALCULATORS MAY BE USED IN THIS PAPER.

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Setter: Mdm Chia Yee Ping

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Answer **all** the questions.

1 A piece of aluminum is heated to 385°C and then left to cool. The temperature of the metal falls at a rate of 17°C/ min for the first 4 minutes and then at a rate of 7°C/ min for the next 12 minutes. Find the temperature of the metal after

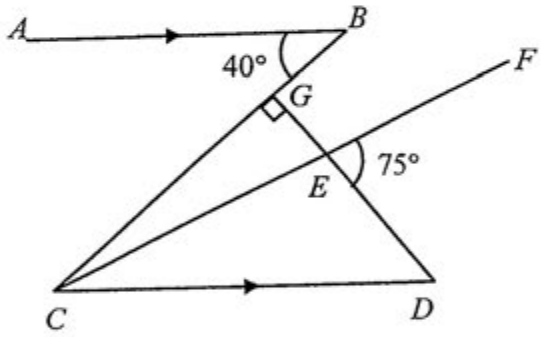
(a) 3 minutes, [1]

(b) 9 minutes. [2]

2 **(a)** Express 45 minutes as a percentage of 2 hours. [1]

(b) X is decreased by 50% and then increased by 50%. Calculate the percentage change in X. [2]

3 The diagram shows two parallel lines AB and CD. Given that $\angle ABC = 40°$, $\angle FED = 75°$ and $\angle CGD = 90°$ and BGC and CEF are straight lines,



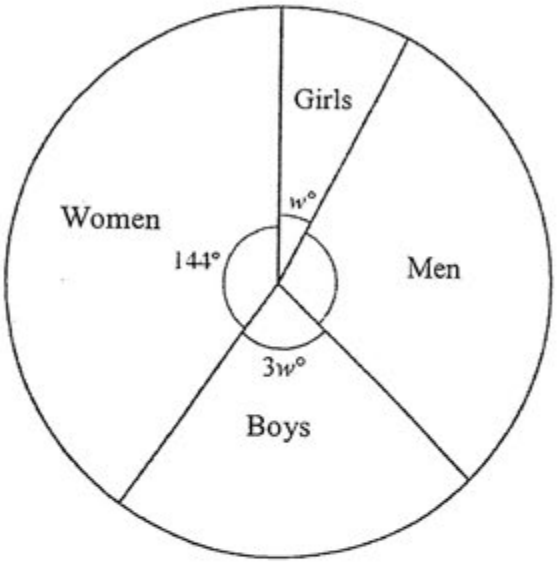
calculate

(a) $\angle FCD$, [2]

(b) $\angle CDE$. [1]

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4 The pie chart below shows the composition of the different groups of participants in a mass event.



Find

(a) the percentage of women in the group, [1]

(b) the value of w if the number of men was four times the number of girls, [2]

(c) the total number of participants if 54 girls attended the event. [1]

5 A thin piece of rectangular metal measures x cm by 14 cm.
It is folded into an open container by cutting a small square of length 2 cm from each corner of the metal. 150 cm^3 of water is poured into the container, leaving $\frac{1}{4}$ of the container unfilled.

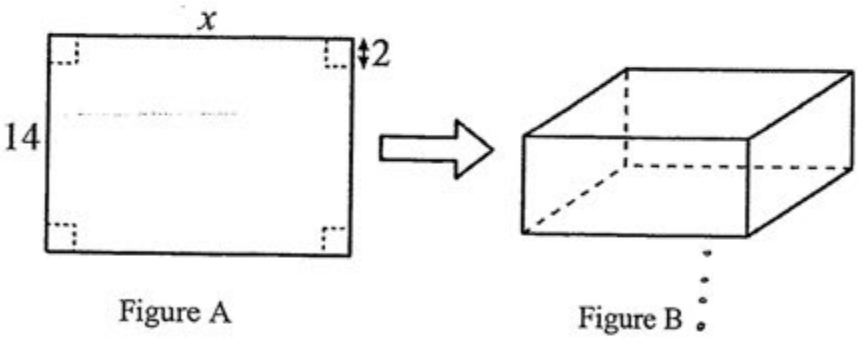


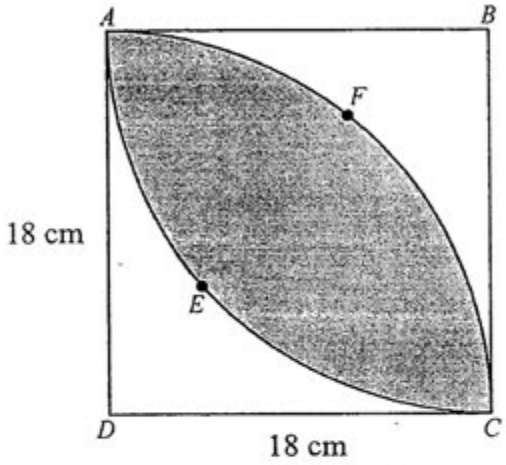
Figure A Figure B

(a) Express the volume of the open container in Figure B in terms of x. [2]

(b) Hence, calculate the value of x. [2]

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6 In the diagram, $ABCD$ is a square of length 18 cm and $BAEC$ and $DAFC$ are quadrants with centres at B and D respectively.



Taking π to be 3.142, calculate

(a) the perimeter of the shaded region, [2]

(b) the area of the shaded region. [3]

7 **(a)** If $b = 4\frac{1}{5}$ and $c = 0.63$, find the ratio of $b : c$. [2]

(b) The ratio of $p : q = 3 : 4$ and $q : r = 5 : 11$. Find the ratio of $p : q : r$. [2]

(c) Jonathan runs 5 km in 20 minutes. He then walks a further 10 km at an average speed of 6 km/h. Calculate his average speed, in km/h, for the whole journey. [2]

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Answer the whole of this question on a piece of blank paper provided.

8 Construct and label the following in a single diagram.

(a) Construct ΔABC where $AB = 7.5\ cm$, $\angle ABC = 120°$ and $BC = 5\ cm$. [2]

(i) Measure and write down the length of AC. [1]

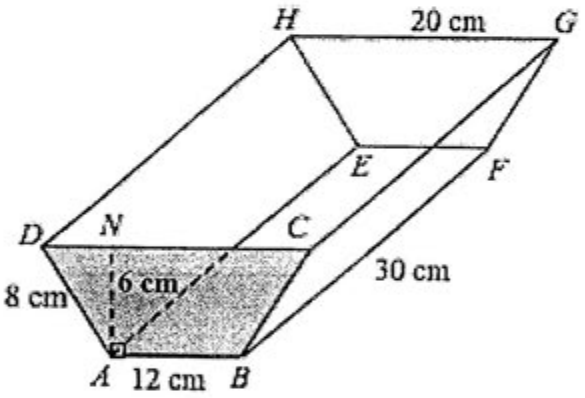
(b) On the same diagram, construct,

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

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

(c) M is the point equidistant from both points A and B and the lines AC and BC. Label M on your diagram and measure the shortest length from M to the line AB. [1]

9 The figure below shows a solid trapezoidal prism block with 6 sides. Given that $AB = EF = 12$ cm, $AD = BC = FG = EH = 8$ cm, $CD = GH = 20$ cm, $BF = AE = 30$ cm and $AN = 6$ cm.



(a) Find

(i) the volume of the solid, [3]

(ii) the total surface area of the solid. [2]

(b) The trapezoidal prism block above is melted down and recast into a cylinder of height 15 cm. Find the radius of the cylinder. [2]

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

10 **(a)** The table below shows some values of x and the corresponding values of y where $y = 3x - 3$. Copy the table and find the values of a and of b. [1]

x	-2	-1	0	1	2
$y = 3x - 3$	a	-6	b	0	3

(b) Use a scale of 2 cm to represent 1 unit on the x-axis, for $-2 \le x \le 2$ and 1 cm to represent 1 unit on the y-axis, for $-9 \le y \le 3$.
Plot the points given in the table and draw the line of $y = 3x - 3$. [2]

(c) Calculate the gradient of the graph. [1]

(d) From the graph of $y = 3x - 3$, find

(i) the value of y when $x = -1.5$, [1]

(ii) the value of a given that the point, $(a, 3.6)$, lies on the graph of $y = 3x - 3$. [1]

(e) On the same axes, draw and label the line $y = 1.2$. [1]

(f) From the graph drawn, write down the coordinates of the point of intersection of $y = 1.2$ and $y = 3x - 3$. [1]

11 **(a)** Solve the following equations.

(i) $\dfrac{4t-3}{3} = 5$ [2]

(ii) $2(x-16) = 4x - 18$ [2]

(iii) $\dfrac{2m-1}{5} - \dfrac{3m+4}{3} = 2$ [4]

(b) If $\dfrac{2x-3y}{4x-5y} = \dfrac{3}{4}$, find the value of $\dfrac{x}{y}$. [3]

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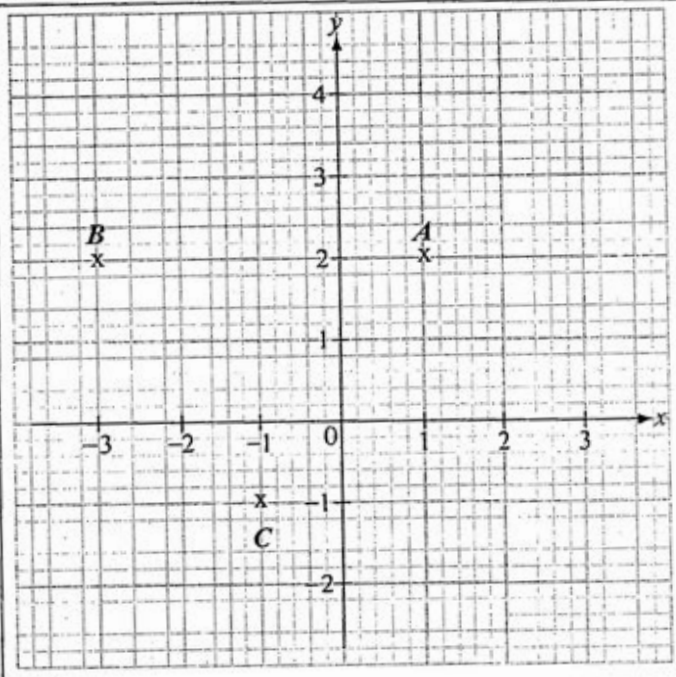
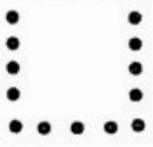
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Secondary School Exam Papers
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EOY 2012
Secondary 1Exp EM Paper 1 (Answer Scheme)

No.	Solution	Marks	Remarks
1a	23.0	B1	
1b	23.050	B1	
2	$\frac{5.0356\times\sqrt{15.798}}{9.675\times 2.026}$ $\approx \frac{5.0\times\sqrt{16}}{10\times 2.0}$ $=1$	M1 A1	Estimation must be shown as part of working to obtain M1
3a	$\frac{1}{2}(\frac{4}{7}+\frac{5}{7})$ $=\frac{9}{14}$	B1	
3b	$2.\dot{9}\dot{0}$	B1	
4a	$105-(-28)$ $=133m$	B1	
4b	$[(-15)-6]\div[4-(-3)]$ $=(-21)\div 7$ $=-3$	M1 A1	Working must be shown to obtain M1
5a	$3x+7\le 22-2x$ $5x\le 15$ $x\le 3$	M1 A1	
5b(i)	$(-12)(7)=-84$	B1	
5b(ii)	$(-12)(-6)=72$	B1	
6a	$\frac{2(5^2)-5(-2)}{4(-2)}$ $=\frac{50+10}{-8}$ $=-7\frac{1}{2}$ or $-\frac{15}{2}$	M1 A1	
6b	$6x-8y+13y$ $=6x+5y$	M1 A1	
7a	$252=2^2\times 3^2\times 7$	B1	
7b(i)	$HCF=2^2\times 3^2$ $=36$	B1	
7b(ii)	$y=2\times 5^2$ $=50$	M1 A1	
8a	$2ab-8a-3bc+12c$ $2a(b-4)-3c(b-4)$ $(2a-3c)(b-4)$	M1 A1	Also accept $(b-4)(2a-3c)$

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8b(i)	$pq - kq = q(p-k)$	B1	
8b(ii)	$42(1560-1660)$ $=-4200$	B1	
9a		B1	
9b	$Gradient = -\frac{3}{2}$	B1	
9c	$D = (3,-1)$	B1	
9d	$4(3) = 12 units^2$	B1	
10a(i)	$x = \frac{(6-2)180°}{6}$ $x = 120°$	M1 A1	
10a(ii)	$y = 360° - 120° - 90°$ $y = 150°$	B1	
10b	$\frac{(n-2)180°}{n} = 150°$ $180n - 360 = 150n$ $30n = 360$ $n = 12$	M1 A1	Also accept: Ext $\angle = 30°$ $n = \frac{360°}{30°}$ ---M1 $=12$ ----A1
11a	 Number of dots =13	B1	Award mark for both correct diagram and number
11b(i)	$T_1 = 4+3(0)$ $T_2 = 4+3(1)$ $T_3 = 4+3(2)$ $T_4 = 4+3(3)$ $T_n = 4+3(n-1)$	M1 A1	Also accept general term $1+3n$

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11b(ii)	$T_{98} = 4 + 3(98 - 1)$ $= 295$	B1	
11b(iii)	$3n + 1 = 1957$ $3n = 1956$ $n = 652$	M1 A1	

--- End of Mark Scheme ---

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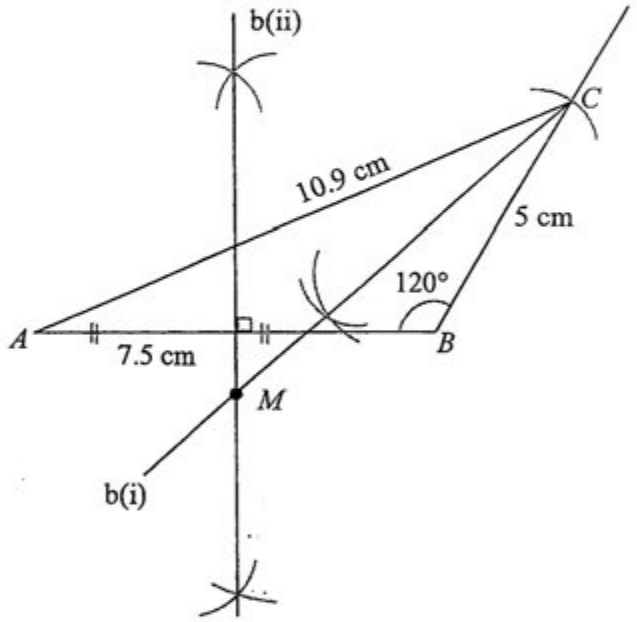

EOY 2012
Secondary 1Exp EM Paper 2 (Answer Scheme)

No.	Solution	Marks	Remarks
1a	Temperature after 3 minutes $=385-17(3)$ $=334°C$	 B1	
1b	Temperature after 9 minutes $=385-17(4)-7(5)$ $=282°C$	 M1 A1	
2a	$\frac{45}{120}\times 100\% = 37.5\%$	B1	
2b	Final value $= 0.5\times 1.5\times x = 0.75x$ Percentage change in x $=\frac{x-0.75x}{x}\times 100\% = 25\%$	 M1 A1	
3a	$\angle BCD = 40°(alt.\angle s, AB // CD)$ $\therefore$ $\angle BCF = 180°-90°-75° = 15°$ (vert opp $\angle$, $\angle$ sum of triangle) $\angle FCD = 40°-15° = 25°$	M1 A1	
3b	$\angle CDE = 75°-25° = 50°$ (ext $\angle$ of triangle)	B1	
4a	Percentage of women in the group $=\frac{144}{360}\times 100\%$ $=40\%$	 B1	
4b	No of men $=4w$ $w+4w+3w = 360°-144°$ $8w = 216°$ $w = 27°$	 M1 A1	
4c	Total number of participants $=\frac{54}{27}\times 360$ $=720$	 B1	

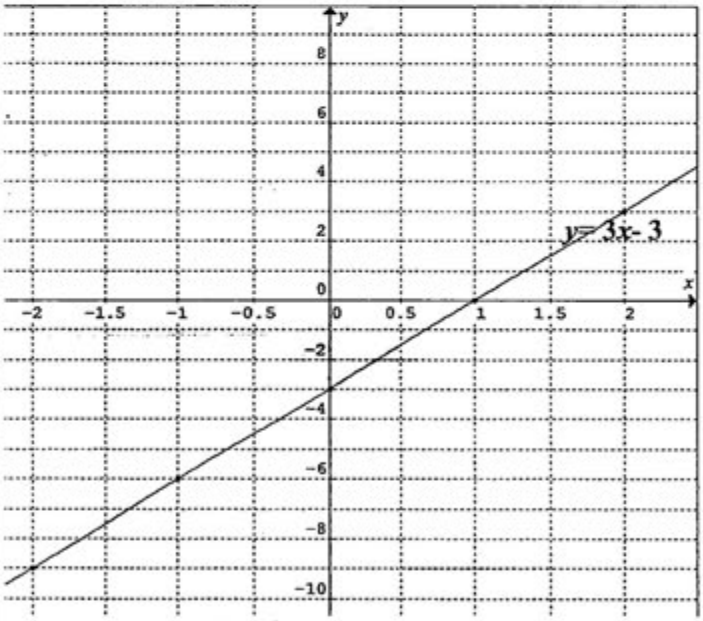
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5a	Dimensions of the open container length = $x-4$ cm, breadth = 10 cm & height = 2 cm Volume of open container $= (x-4)(10)(2)$ $= 20x-80$	M1 A1	
5b	$\frac{3}{4}(20x-80)=150$ $15x-60=150$ $15x=210$ $x=14cm$	M1 A1	Accept error carried forward for volume of container.
6a	Perimeter of shaded region = Perimeter of a semi-circle $=\frac{1}{2}(3.142)(2)(18)$ $=56.556cm$ $=56.6cm(3s.f.)$	 M1 A1	
6b	Area of one quadrant $=\frac{1}{4}(3.142)(18^2)$ $=254.502cm^2$ Area of the triangle $=\frac{1}{2}(18)(18)$ $=162cm^2$ Area of shaded region $=2(254.502-162)$ $=185.004cm^2$ $=185cm^2(3s.f.)$	 M1 M1 A1	
7a	$4\frac{1}{5}:0.63$ $=\frac{21}{5}:\frac{63}{100}$ $=\frac{420}{100}:\frac{63}{100}$ $=20:3$	 M1 A1	

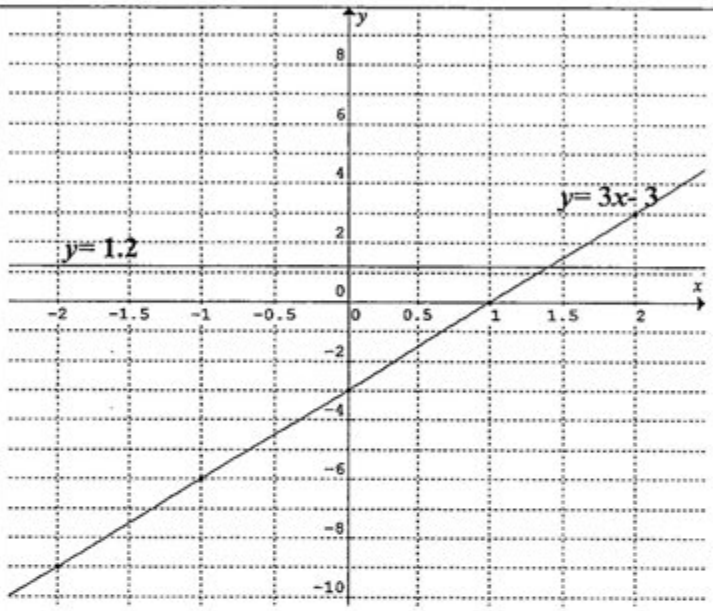
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7b	<table><tr><td>p</td><td>q</td><td>r</td></tr><tr><td>3</td><td>4</td><td></td></tr><tr><td></td><td>5</td><td>11</td></tr><tr><td>$3\times5=15$</td><td>$4\times5=20$</td><td>$11\times4=44$</td></tr></table> $p:q:r$ $=15:20:44$	M1 A1	Accept any form of suitable working.
7c	Time taken to walk 10 km $=\frac{10}{6}=\frac{5}{3}hrs$ Average speed $=\frac{5+10}{\frac{20}{60}+\frac{5}{3}}$ $=7.5km/h$	 M1 A1	
8abc			
8a	AB is exactly 7.5cm and labeled. Angle ABC & length BC are correct and labeled.	D1 D1	
8ai	AC = 10.9 cm $\pm$ 0.1 cm	B1	
8bi	Angle bisector of $\angle ACB$ is accurately constructed. - Construction line - Angle bisector drawn	 D1	
8bii	Perpendicular bisector line AB is accurately constructed. - Construction line - Perpendicular bisector drawn	 D1	
8c	Length of M to AB = 1.1 cm $\pm$ 0.1 cm	B1	M must be labeled.

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9ai	Base area = Area of trapezium $ABCD$ $= \frac{1}{2}(6)(12+20)$ $= 96cm^2$ Volume of solid $= (96)(30)$ $= 2880cm^3$	M1 M1 A1	
9aii	Total surface area $= 2(96) + (8+12+8+20)(30)$ $= 1632cm^2$	M1 A1	
9b	Volume of trapezoidal prism = Volume of cylinder $2880 = \pi r^2 h$ $2880 = (3.142)(r^2)(15)$ $r^2 = 61.10757...$ $r = 7.817cm$ $r = 7.82cm(3.s.f)$	M1 A1	
10a	$a = -9$ $b = -3$	B1	1 mark awarded for both correct answers
10b	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>$y = 3x - 3$</td><td>-9</td><td>-6</td><td>-3</td><td>0</td><td>3</td></tr></table>  Axes and scale clearly drawn and stated Line is accurately drawn and passes through at least 2 correct points with labeling of graph	 D1 D1	

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10c	*Gradient* = 3	B1	
10di	$x = -1.5,\ y = -7.5$	B1	Accept accuracy of ± 0.2. No marks given if value is not found from the graph
10dii	$y = 3.6,\ a = 2.2$	B1	
10e	 - Line is accurately drawn with labeling of graph	D1	
10f	Coordinates of intersection point = (1.4, 1.2)	B1	No marks given if value is not found from the graph
11ai	$\frac{4t-3}{3} = 5$ $4t - 3 = 15$ $4t = 18$ $t = 4.5 / \frac{9}{2} / 4\frac{1}{2}$	M1 A1	
11aii	$2(x-16) = 4x - 18$ $2x - 32 = 4x - 18$ $2x = -14$ $x = -7$	M1 A1	

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11aii	$\frac{2m-1}{5}-\frac{3m+4}{3}=2$ $3(2m-1)-5(3m+4)=30$ $6m-3-15m-20=30$ $9m=-53$ $m=-\frac{53}{9}/-5\frac{8}{9}/-5.89(3s.f.)$	 M1 M1 M1 A1	
11b	$\frac{2x-3y}{4x-5y}=\frac{3}{4}$ $3(4x-5y)=4(2x-3y)$ $12x-15y=8x-12y$ $4x=3y$ $\frac{x}{y}=\frac{3}{4}$	 M1 M1 A1	

--- End of Mark Scheme ---

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