Name	Register Number	Class

智行慈愿

MANJUSRI SECONDARY SCHOOL
文殊中学

END-OF-YEAR EXAMINATION 2011

Subject:	Mathematics
Paper:	1
Level:	Secondary 1 Express
Date:	6 October 2011
Duration:	1 hour
Setter:	Mrs Teo Hwee Ping

INSTRUCTIONS TO CANDIDATES

Write your name, register number and class in the space at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
If working is needed for any question, show it in the space below the question.
Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

INFORMATION TO CANDIDATES

The number of marks is given in brackets [ ] at the end of each questions or part question.

The total marks for this paper is **40**.

Marks Obtained
40

This paper consists of 8 printed pages, including the cover page.

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Answer **all** questions.

1. **Evaluate** $52.3 - (-20.1)$

Ans: _____ [1]

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2. **Estimate**

(a) $73481 - 51901$, correct to 2 significant figures,

(b) $0.059 \div 1.02$, correct to 1 significant figure.

Ans: (a) _____ [1]

(b) _____ [1]

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3. In a school election for the head prefect, there were 3 candidates *A*, *B*, and *C*.

Given that there were 1200 voters and the votes for the 3 candidates were divided in the ratio of 11 : 7 : 2 . Calculate

(a) the number of votes that the winning candidate received,

(b) the difference between the highest number and lowest number of votes.

Ans: (a) _____ [1]

(b) _____ [1]

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4. Given that $2x < 17$, state the largest possible value of x if

(a) x is a prime number,

(b) x is a multiple of 3.

Ans: (a) _____ [1]

(b) _____ [1]

---

5. Given that $K = 2^6 \times 7^2$, find the

(a) positive square root of K,

(b) cube root of $7K$.

Ans: (a) _____ [1]

(b) _____ [1]

---

6. Factorise

(a) $13bc + 13c$,

(b) $3(x-2y) - 7a(2y-x)$.

Ans: (a) _____ [1]

(b) _____ [1]

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7. Simplify

(a) $-12a+(-3a)$,

(b) $\frac{2x-1}{3}-\frac{x-1}{2}$.

Ans: (a) _____ [1]

(b) _____ [2]

---

8. (a) The exterior angle of a regular polygon is 40°. How many sides does this polygon have?

(b) Given that the interior angles of a pentagon are $x°$, $(x + 30)°$, $3x°$, $(3x + 10)°$ and $(x + 50)°$. Find the largest interior angle.

Ans: (a) _____ [1]

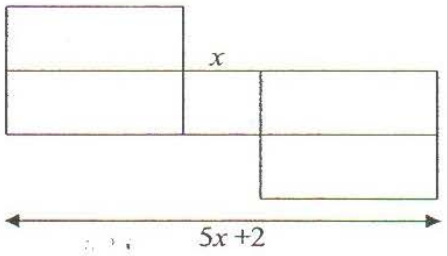
(b) _____ [2]

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9. The figure below shows a net of an open cuboid.
The open cuboid has a square base of side x cm.
Write and simplify an algebraic expression for

(a) the height of the cuboid,

(b) the perimeter of the net of the cuboid,



Ans: (a) _____ [1]

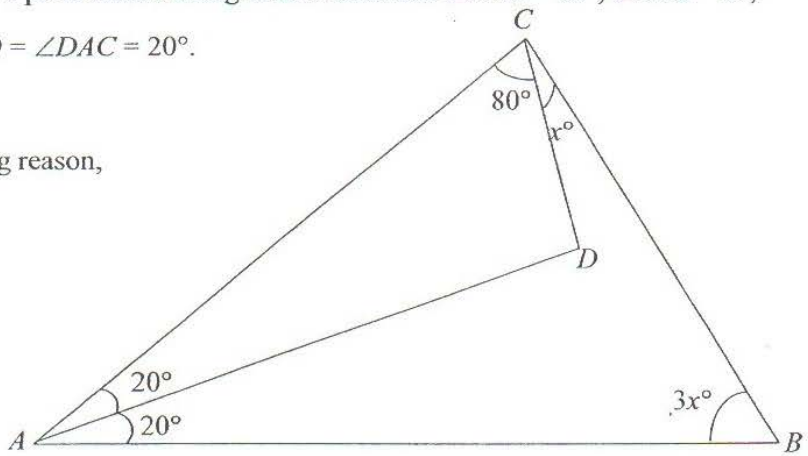
(b) _____ [2]

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10. In the figure below, D is a point inside triangle ABC such that $\angle ACD = 80°$, $\angle DCB = x°$, $\angle CBA = 3x°$, and $\angle BAD = \angle DAC = 20°$.
Find,

(a) reflex $\angle CDA$, stating reason,

(b) the value of x.

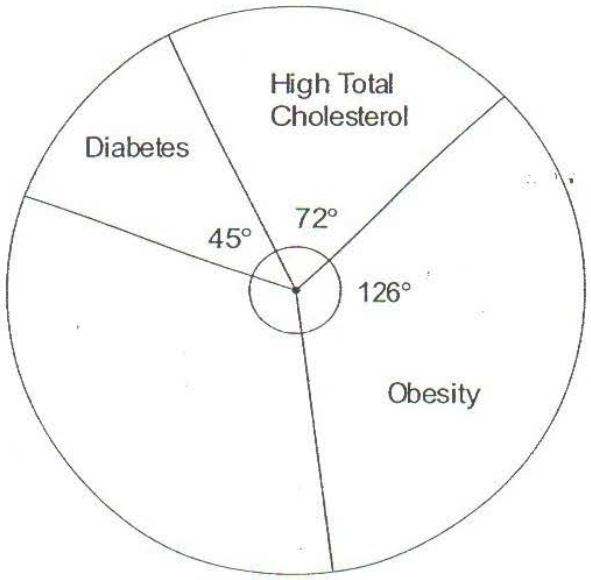


Ans: (a) reflex $\angle CDA$ = _____ [1] (reason: _____) [1]

(b) x = _____ [2]

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11. The result of a health survey conducted with 200 adults aged 18 to 69 years old is shown in the pie chart below.



(a) Calculate the number of adults in the survey who have high total cholesterol.

(b) Besides the 3 categories shown, it was also found that 50 adults in the survey have hypertension and the rest in the survey have lung disease.

(i) Calculate the angle of the sector representing the number of adults who have hypertension.

(ii) Complete the pie chart using protractor and a ruler, labeling clearly each sector.

(c) State an advantage of representing this health survey result in a pie chart.

Ans: (a) _____ [1]

(b) (i) _____ [1]

(ii) on pie chart [1]

(c) _____ [1]

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12. In the space provided below,

(a) construct ΔABC in which $AB = 10$ cm, $BC = 7.2$ cm and $AC = 6.4$ cm. [2]

(b) measure and write down $\angle ABC$.

(c) on the same diagram, draw and label clearly, [2]

(i) the perpendicular bisector of BC,

(ii) the angle bisector of $\angle BAC$.

(d) The two lines drawn in part (c) meet outside the triangle at a point P.

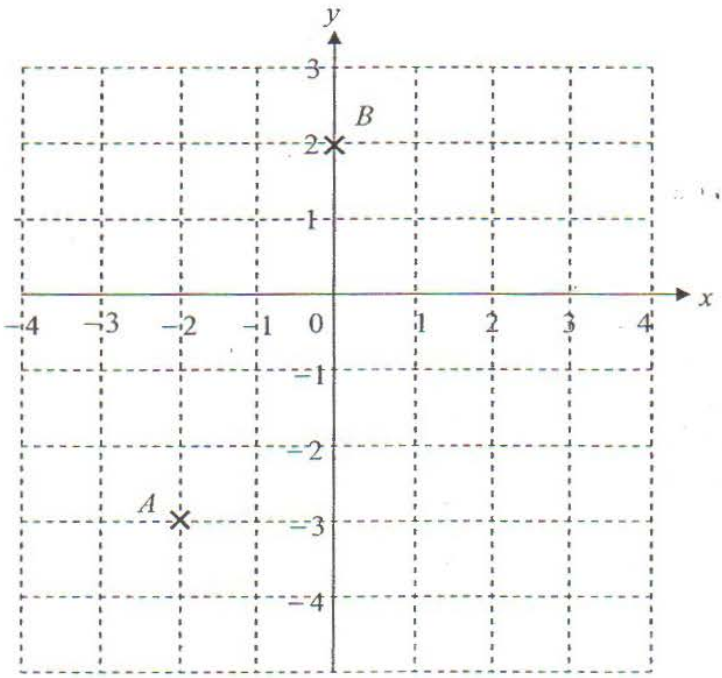
Measure and write down the distance of P from B.

Ans: (b) $\angle ABC =$ _____ [1]

(d) $PB =$ _____ [1]

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13. Two points A and B are marked in the Cartesian plane below.



(a) Write down the coordinates of A and B.

(b) On the graph, plot and label clearly, the point $D(1, -3)$.

(c) Write down the coordinates of the point C such that $ABCD$ is a parallelogram.

(d) Find the area of $ABCD$.

(e) Write down the coordinates of a point E such that triangle BDE and triangle ABD have the same area.

Ans: (a) $A = (_____, _____)$ [1]

$B = (_____, _____)$ [1]

(b) Mark on graph above [1]

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

(d) _____ [1]

(e) $E = (_____, _____)$ [1]

✦ *end of paper* ✦

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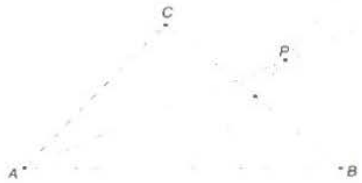


END-OF-YEAR EXAMINATION 2011
Sec One Express Mathematics Paper 1
Mark Scheme

1. $52.3-(-20.1)=52.3+20.1$ $=72.4$	 B1
2. (a) $73500-51900=22000$ (b) $0.06\div1=0.06$	B1 B1
3. (a) 660 (b) 540	B1 B1
4. $x<8.5$ → (a) 7 (b) 6	B1 B1
5. (a) $\sqrt{K}=2^3\times7=56$ (b) $\sqrt[3]{7K}=2^2\times7=28$	B1 B1
6. (a) $13c(b+1)$ (b) $(x-2y)(3+7a)$	B1 B1
7. (a) $-15a$ (b) $=\frac{4x-2}{6}-\frac{3x-3}{6}$ $=\frac{4x-2-3x+3}{6}$ $=\frac{x+1}{6}$	B1 M1 A1
8. (a) Number of sides $=360\div40=9$ (b) $9x+90=540$ $x=50$ Largest interior angle $=160°$	B1 M1 A1
9. (a) $2x+1$ (b) Perimeter $=2(5x+2)+6x=16x+4$	B1 M1, A1

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10. (a) reflex $\angle CDA = 360 - 80 = 280°$ (reason: angles at a point) (b) $x + 3x + 20 + 280 = 360$ or $80 + x + 3x + 40 = 180$ $x = 15$	B1 A1 M1 A1
11. (a) $\frac{72}{360} \times 200 = 40$ (b) (i) $\frac{50}{200} \times 360 = 90°$ (ii) Correct angle and label (c) It can compare the parts with the whole.	B1 B1 B1 B1
12. (b) $\angle ABC = 40° (\pm 1°)$ (d) $PB = 3.9 \pm 0.1$ cm	B1 B1

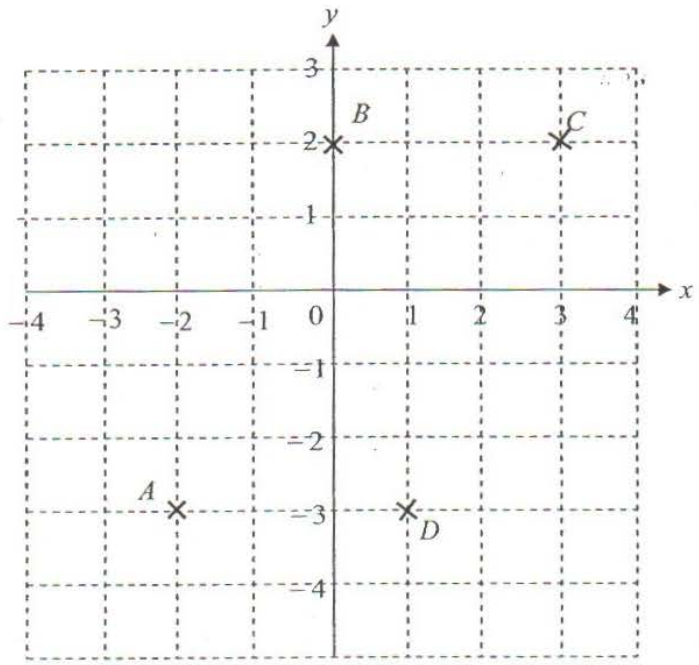


(a) Construction of triangle:
Correct construction lines [M1]
Accuracy [A1]

(c) (i) perpendicular bisector [B1]
angle bisector [B1]

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13.



(a) $A = (-2, -3)$	B1
$B = (0, 2)$	B1
(b) point D on graph	B1
(c) $C = (3, 2)$	B1
(d) $3 \times 5 = 15 units^2$	B1
(e) either $(4, -3)$ or $(-3, 2)$	B1

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MANJUSRI SECONDARY SCHOOL

文 殊 中 学

END-OF-YEAR EXAMINATION 2011

Subject:	Mathematics
Level:	Secondary 1 Express
Paper:	2
Date:	11 October 2011
Duration:	1 hour 30 mins
Setter:	Mrs Teo Hwee Ping

ADDITIONAL MATERIALS
Electronic Calculator

INSTRUCTIONS TO CANDIDATES

Write your Name, Register Number and Class in the spaces provided above.

Write your answers and working in the papers provided.

All necessary working must be shown.

Submit this question paper at the end of the session.

Answer **all** questions.

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.

You are expected to use an electronic calculator for this paper.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to three significant figures. Answers in degrees should be given to one decimal place.

For π, use either your calculator value or 3.142.

The total marks for this paper is **60**.

Marks Obtained
/ 60

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Answer **all** questions.

1. With the use of a calculator,

   (a) evaluate $\frac{172.68}{\sqrt{12.9^2 - 34.326}}$, correct to 4 significant figures, [1]

   (b) express $\frac{9}{11}$ as a recurring decimal. [1]

---

2. Hazel, Irene and Justin visit the National Library every 6 days, 18 days and 3 weeks respectively. If the 3 good friends meet one another on 31st August 2011, what is the date that they will next meet at the library again? [3]

---

3. A sequence of patterns formed by dots and lines are shown below.



Pattern 1 Pattern 2 Pattern 3

   (a) Find the number of dots

      (i) in the 5^{th} pattern, [1]

      (ii) in the n^{th} pattern. [1]

   (b) Pattern n has 288 dots. Find the value of n. [2]

---

4. (a) Express 240 millilitres ($m\lambda$) as a percentage of 3 litres (λ). [1]

   (b) From 12.30 pm to 3 pm, the volume of water in an open container decreased 27% to 3 litres.

      (i) Calculate the original volume of water. [2]

      (ii) Calculate the rate of decrease in volume of water in cm^3 per hour. [2]

---

5. A car travels at 90 km/h for 30 minutes and then travels 90 km for 1 hour 30 minutes. Find

   (a) the distance travelled for the first part of the journey, [1]

   (b) the speed of the car for the second part of the journey, [1]

   (c) the average speed of the whole journey in metres per seconds. [3]

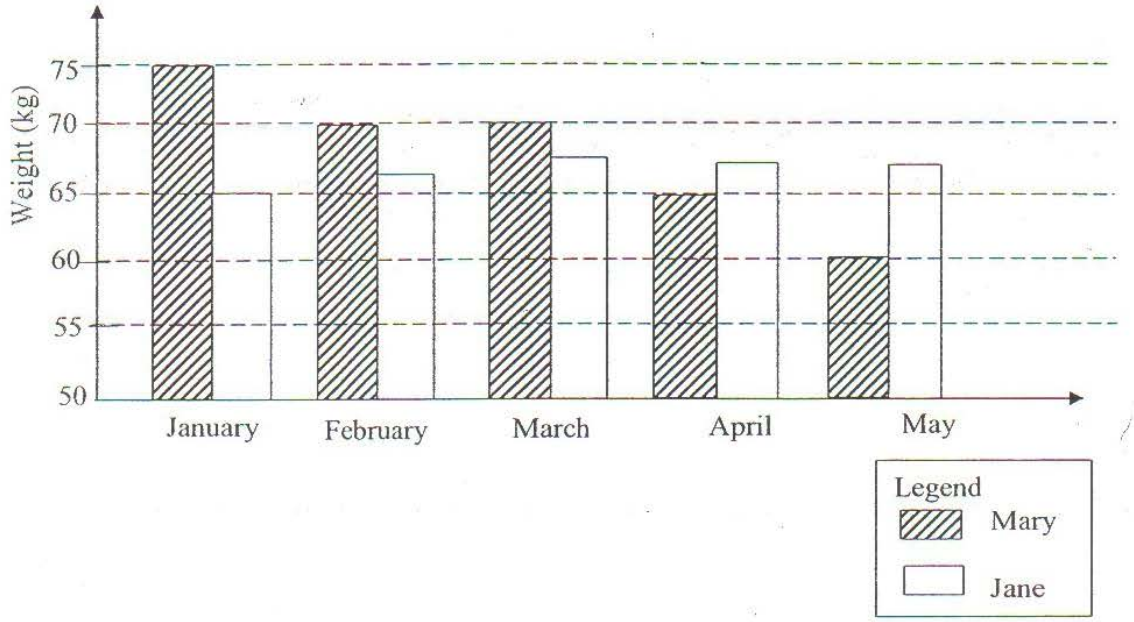
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6. (a) Simplify algebraic expression $-4(a+b)+[a-2(b-a)]$. [2]

(b) Solve the algebraic equation $\frac{5}{2}-\frac{4x-3}{3}=\frac{1}{2}-x$. [3]

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7. The bar graph below shows the weight of Mary and Jane over a period of 5 months.



Use the bar graph to answer the following questions:

(a) What is Mary's weight in April? [1]

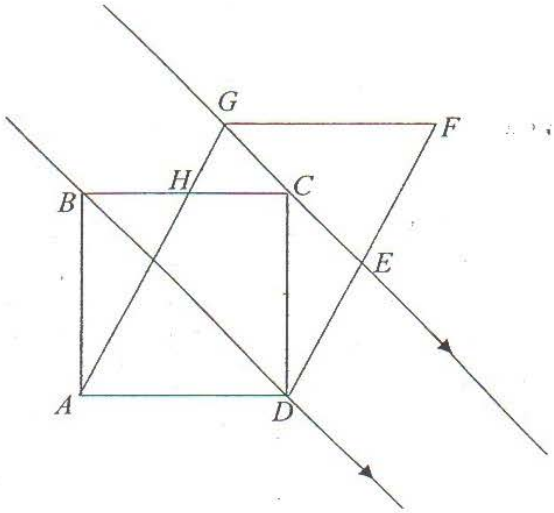
(b) What is the difference in weight between Mary and Jane in January? [1]

(c) Calculate the average rate of Mary's weight loss per month. [2]

(d) If Mary's ideal weight is 46kg, can she reach her ideal weight by October? Explain your answer, supported by calculations. [2]

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8. In the diagram, $ABCD$ is a square and $AGFD$ is a parallelogram. The lines BD, GC and CE are parallel lines. AG and BC meet at the point H.



Given that $\angle GFD = 36°$,

(a) name **two** angles that are equal to $\angle GFD$, [2]

(b) find $\angle AHC$, stating the reason, [2]

(c) find $\angle CED$. [2]

---

9. In a class test, Alice scored x marks, Alvin scored 25% more than Alice and Alex scored 50% less than Alvin.

(a) Write down, in terms of x, an algebraic expression for

(i) Alvin's marks, [1]

(ii) Alex's marks. [1]

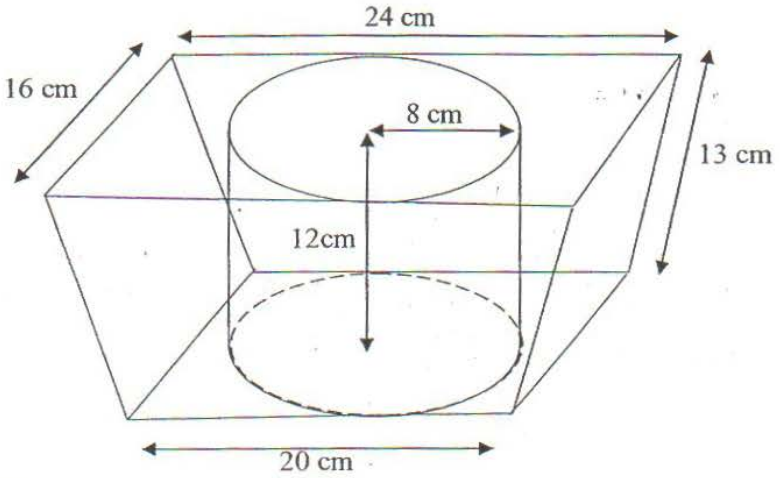
(b) Given that the sum of Alice's and Alex's marks is 9 more than Alvin's marks, form an equation in x. Solve it to find the value of x. [3]

(c) Given that Alvin scored 18 marks in the previous test, calculate the percentage increase in Alvin's marks. [2]

(d) Given that there was a drop of 40% in Alex's marks as compared to the previous test, calculate Alex's marks in the previous test. [2]

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10. A cylindrical container (hollow) of radius 8 cm and a height of 12 cm is mounted in a wooden prism solid with the same height as shown in the diagram below.



Calculate,

(a) the volume of the cylindrical container, leaving your answer in 3 decimal places, [2]

(b) the volume of wood used in the solid, [3]

(c) the total surface area of the wooden solid (exclude inner cylinder). [3]

---

11. ***Answer the whole of this question on graph paper.***

(a) A table of values for the equation $y = -3x + 2$ is shown below.

x	-2	-1	0	1	2
y	8	a	2	-1	b

(i) Find the values of a and of b. [1]

(ii) Using a scale of 4 cm to represent 1 unit, draw a horizontal x-axis for $-2 \le x \le 2$.
Using a scale of 2 cm to represent 2 units, draw a vertical y-axis for $-6 \le y \le 10$.
Plot the points in the table and draw the graph of $y = -3x + 2$. [3]

(b) (i) On the same graph paper, plot the 3 points (–2, –4), (0, –2) and (2, 0) and join them to form a straight line. [2]

(ii) Write down an equation for this straight line graph. [1]

✦ *end of paper* ✦

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END-OF-YEAR EXAMINATION 2011
Sec One Express Mathematics Paper 2
Mark Scheme

1. (a) 15.03 (b) $0.\dot{8}\dot{1}$	B1 B1
2. LCM of 6, 18, 21 = $3\times2\times1\times3\times7$ = 126 days Date they meet again → 4th January 2012	M1, A1 A1
3. (a) (i) 12 (ii) $2n+2$ (b) $2n+2=288$ $n=143$	B1 B1 M1 A1
4. (a) $\frac{240}{3000}\times100=8\%$ (b) (i) $\frac{100}{73}\times3=4.11\lambda$ (ii) $\frac{1.11}{2.5}=0.444\times1000$ = 444 cm^3 per hour	B1 M1, A1 M1, A1
5. (a) Distance = 90 × 0.5 = 45 km (b) Speed = $\frac{90}{1.5}$ = 60 km/h (b) Average speed = $\frac{45+90}{2}$ = 67.5 km/h = 18.75 m/s	B1 B1 M1, A1 A1

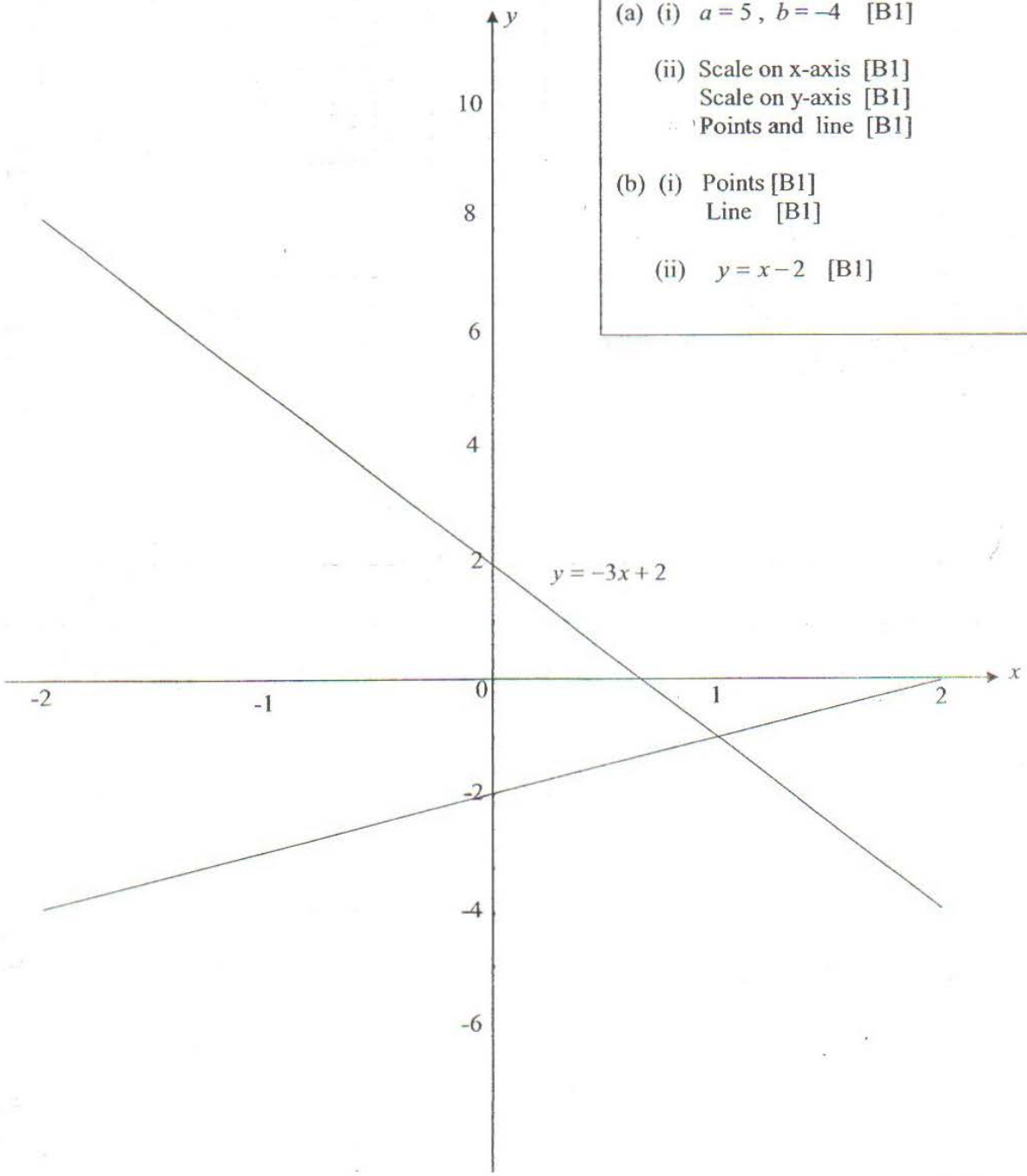
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6. (a) $-4(a+b)+[a-2(b-a)] = -4a-4b+[a-2b+2a]$ $= -4a-4b+3a-2b$ $= -a-6b$	M1 A1
(b) $\frac{15}{6}-\frac{8x-6}{6}=\frac{3}{6}-\frac{6x}{6}$ $15-8x+6=3-6x$ $-2x=-18$ $x=9$	M1 M1 A1
7. (a) 65 kg (b) $75-65=10$ kg (c) average rate $=\frac{15}{5}=3$ kg / month (d) $(60-46)\div 3=4.67$ months Mary needs about 5 months after May to reach her ideal weight assuming she lose 3kg / month. By end of October, she should be able to reach her ideal weight.	B1 B1 M1, A1 B1 (relevant calculations) B1 (logical reasoning connected to their calculations)
8. (a) $\angle GAD$, $\angle BHA$, $\angle GHC$ (b) $\angle AHC = 180-36=144°$ (either Opposite interior angles of parallel lines or Angles on a straight line) (c) $\angle BDE = 144-45=99°$ $\angle CED = 180-99=81°$	B1, B1 (any two) B1 A1 M1 o.e. A1

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9. (a) (i) $1.25x$	B1 o.e.
(ii) $\frac{50}{100}\times 1.25x = 0.625x$	B1 o.e.
(b) $x + 0.625x = 9 + 1.25x$	B1
$0.375x = 9$	M1
$x = 24$	A1
(c) percentage increase $= \frac{30-18}{18}\times 100 = 66.7\%$	M1, A1
(d) 60% → 15 marks	
Alex's marks in previous test $= \frac{100}{60}\times 15 = 25$	M1, A1
10. (a) Volume of cylinder $= \pi\times 8^2\times 12 = 2412.743\,\text{cm}^3$	M1, A1
(b) Volume of wood $= \frac{1}{2}(20+24)(12)\times 16 - 2412.743$	M1 (volume of prism),
	M1 (difference)
$= 1811.3 \approx 1810\,\text{cm}^3$	A1
(c) Total surface area =	
$20\times 16 + \frac{1}{2}(20+24)(12)\times 2 + 13\times 16\times 2 + (24\times 16 - \pi\times 8^2)$	M1 (at least 2 correct)
	M1 (all surfaces considered)
$= 1446.938 \approx 1450\,\text{cm}^2$	A1
11. Graph Paper (P.T.O.)	

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(a) (i) $a = 5$, $b = -4$ [B1]

(ii) Scale on x-axis [B1]
Scale on y-axis [B1]
Points and line [B1]

(b) (i) Points [B1]
Line [B1]

(ii) $y = x - 2$ [B1]

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