SIGLAP SECONDARY SCHOOL

Go forth with wisdom and courage

Mathematics 4016/1

End Of Year Examination 2011

Secondary One Express

Name : _____ ( ) Date : 11 Oct 2011

Class : 1E( ) Duration : 1 h 30 mins

READ THESE INSTRUCTIONS FIRST

Write your name and index number 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 staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions in this paper
The number of marks is given in brackets [ ] at the end of each question or part question.

Omission of essential working will result in loss of marks.
The total number of marks for this paper is 60.

The use of an electronic calculator is expected, where appropriate.
If the degree of accuracy is not specific 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.

You are reminded of the need for clear presentation in your answers.

Score			
Total marks	60	Parent's Signature	Date

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This paper consists of 11 printed pages and 1 blank page.

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[Turn Over

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Answer all questions.

1. (a) Find, in its simplest form, the fraction which is exactly halfway between $\frac{7}{9}$ and $\frac{8}{9}$.

(b) Without using calculator, evaluate $\left(-2\frac{1}{2}+\frac{5}{3}\right)\div\left(-4\frac{1}{3}\right)$.

Show your workings clearly. Give your answer as a fraction in its simplest form.

Ans : (a) _____ [1]

(b) _____ [2]

---

2. Evaluate each of the following, giving your answers correct to 3 significant figures.

(a) $12.352-1\frac{5}{11}\times\frac{8.92}{(1.357)^2}$

(b) $\frac{3\pi-26.3}{\sqrt{12.65+0.02}}$

Ans : (a) _____ [1]

(b) _____ [1]

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3. (a) If one fifth of 2520 is the same as $2^x \times 3^y \times 7^z$,

what are the values of x, y and z?

(b) Hence or otherwise, find the smallest value of k where $2^x \times 3^y \times 7^z \times k$ is a perfect cube.

Ans : (a) $x =$ _____ [1]

$y =$ _____ [1]

$z =$ _____ [1]

(b) _____ [1]

4. Consider the following numbers:

$$\sqrt{2}, \quad \frac{18}{5}, \quad \sqrt{64}, \quad -\frac{9}{3}, \quad 0.78, \quad 0$$

Write down the

(a) integers

(b) irrational numbers

Ans : (a) _____ [1]

(b) _____ [1]

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5. A cyclist travels 10.8 km in 1 hour. Find its average speed in

(a) m/min,

(b) cm/s.

Ans : (a) _____ m/min [1]

(b) _____ cm/s [1]

6. Given that $C = F^2 + \frac{1}{2}pn$, find the value of n when $F = 5$, $p = 0.4$, and $C = 65$.

Ans : _____ [2]

7. Factorize the following completely

(a) $-6rs - 24st$,

(b) $9gh + 45h - 15 - 3g$.

Ans : (a) _____ [1]

(b) _____ [2]

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8. (a) Simplify $2[3p - 2(p - 2q)]$.

(b) Subtract the sum of $5ab + a - 3b$ and $2a - 4b + ba$ from $10 - 7ab$.

Ans : (a) _____ [2]

(b) _____ [3]

---

9. Eugene has $2x$ books.
Hafiz has 4 more books than Eugene.
Darren has half as many books as Hafiz.

(a) Write down an expression, in terms of x, for the number of books that Darren has.

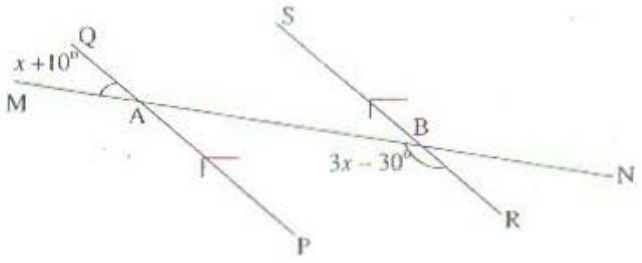
(b) The total number of books is 121. Find the number of books that Hafiz has.

Ans : (a) _____ [1]

(b) _____ [2]

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10. In the figure, $PQ \parallel RS$, $\angle QAM = x + 10^\circ$ and $\angle ABR = 3x - 30^\circ$. Find the value of x.



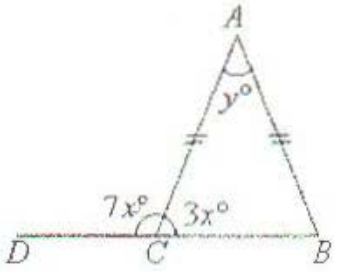
Ans : _____ [2]

---

11. Given that $AB = AC$, $\angle ACD = 7x^\circ$, $\angle BCA = 3x^\circ$ and $\angle BAC = y^\circ$, calculate the value of

(a) x,

(b) y.



Ans : (a) _____ [2]

(b) _____ [1]

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12. Consider the number pattern below:

5, 11, 17, 23, 29, 35, 41, ...

(a) Write down the 10^{th} term of the pattern.

(b) Write down the n^{th} term of the pattern.

Ans : (a) _____ [1]

(b) _____ [1]

---

13. (a) During the Great Singapore Sale, the prices of Mokia handphones were sold at 30% discount. William bought the phone before the sale started. How much did he pay for it if the price of the phone during the sale was $285 ? **Give your answer to the nearest cents.**

(b) Mr Aqeel bought a condominium in 2004 for $500 000. He sold it in 2010 for $650 000. Find the percentage increase in the price of the condominium.

Ans : (a) $_____ [2]

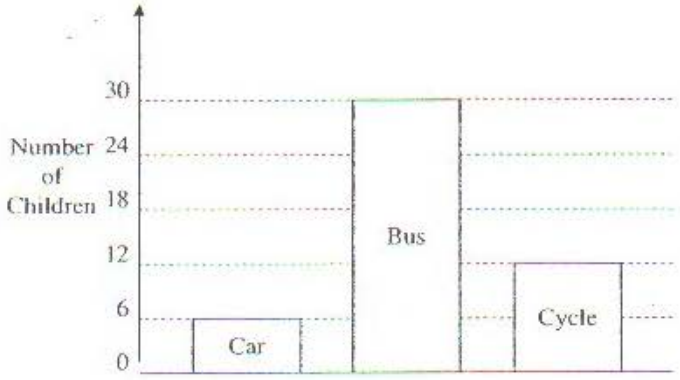
(b) _____ % [2]

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14. A sum of money was divided between A, B and C in the ratio 2 : 3 : 4.
If instead, this money had been divided equally between them, A would have received an extra \$20. What was the total sum of money?

Ans : \$_____ [2]

15. In a survey, 48 children were asked how they travelled to school.
The results of the survey are shown in the bar chart.



(a) Express the total number of children who travelled by bus or cycled as a fraction of the total number of children.
Give your answer in its lowest terms.

(b) The same information is to be shown in a pie chart.
Find the angle which represents the children who travelled by car.

(c) Calculate the percentage of children who travelled by bus to school.

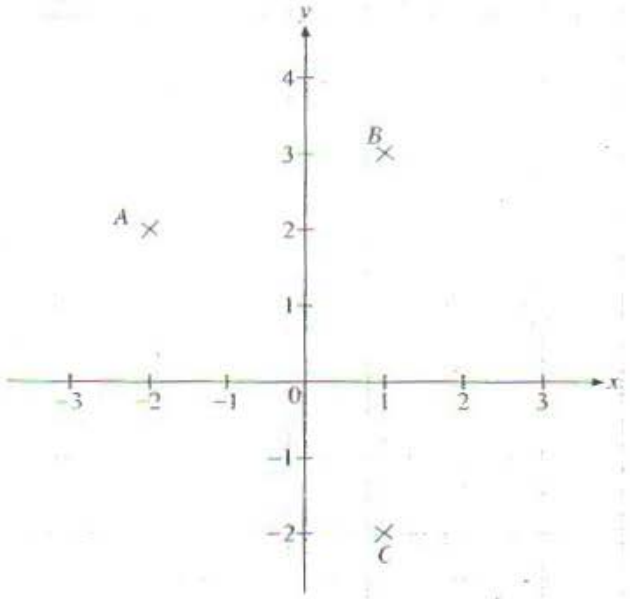
Ans : (a) _____ [1]

(b) _____ ° [2]

(c) _____ % [1]

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16.



(a) Write down the coordinates of points A and C.

(b) Plot the point $D(-2, 0)$ and label it clearly. Join all the points and write down the name of the quadrilateral $ABCD$.

(c) Find the area of the quadrilateral $ABCD$.

(d) Find the gradient of AB.

Ans : (a) A (,) [1]

C (,) [1]

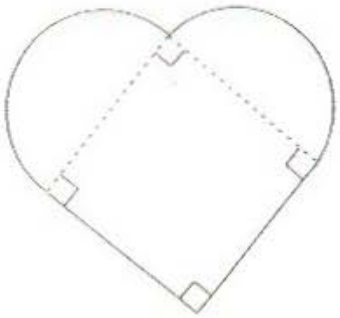
(b) _____ [2]

(c) _____ square units [2]

(d) _____ [2]

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17.



Saran made a Valentine's Day card which is made from a square and two semi-circles. If the area of the square is 100 cm^2, calculate

(a) the total area of the card,

(b) the perimeter of the card.

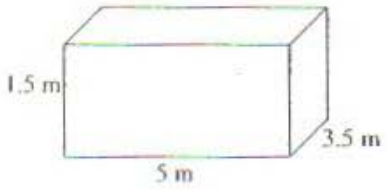
(Take π to be 3.14)

Ans : (a) _____ cm^2 [2]

(b) _____ cm [2]

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18.



A swimming pool measures 3.5 m by 5 m and the height of the wall is 1.5 m.

(a) Calculate the volume of the swimming pool.

(b) Uncle Jared has to paint the inner surface of the pool. Given that 1 litre of paint can cover 5 m^2, how many litres of paint does he require ?

(b) The paint is sold in 4-litre containers. Find the least number of containers of paint that Uncle Jared needs to buy.

Ans: (a) _____ m^3 [1]

(b) _____ litres [3]

(c) _____ [1]

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1 EXPRESS EOY MATHS ANSWER KEYS

1(a) $\frac{5}{6}$	B1
(b) $\left(-2\frac{1}{2}+\frac{5}{3}\right)\div\left(-4\frac{1}{3}\right)$	
$\left(-\frac{15}{6}+\frac{10}{6}\right)\div\left(-\frac{13}{3}\right)$	M1
$=\left(-\frac{5}{6}\right)\times\left(-\frac{3}{13}\right)$	
$=\frac{5}{26}$	A1
2(a) $12.352-1\frac{5}{11}\times\frac{8.92}{(1.357)^2}$	B1
$= 5.31$	
(b) $\frac{3\pi-26.3}{\sqrt{12.65\div 0.02}}$	B1
$= -0.671$	
3 (a) $\frac{1}{5}\times 2520 = 504$ $504 = 2^3\times 3^2\times 7$ Therefore, $x=3, y=2, z=1$	B1 for each correct answer.
(b) For a perfect cube, $504\times k = 2^3\times 3^2\times 7\times 3\times 7\times 7$ $\therefore k = 3\times 7\times 7$ $= 147$	B1
4 (a) $-\frac{9}{3}$, 0, $\sqrt{64}$	B1

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(b) $\sqrt{2}$	B1

5 (a) 180 m/min	B1
(b) 300 cm/s	B1
6. $C = F^2 + \frac{1}{2}pn$ $65 = 25 + \frac{1}{2}(0.4)(n)$ $40 = 0.2n$ $n = 200$	M1 A1
7 (a) $-6rs - 24st$ $= -6s(r + 4t)$	B1
(b) $9gh + 45h - 15 - 3g$ $= 9h(g + 5) - 3(5 + g)$ $= (g + 5)(9h - 3)$ $= 3(g + 5)(3h - 1)$	M1 A1
8 (a) $2[3p - 2(p - 2q)]$ $= 2[3p - 2p + 4q]$ $= 6p - 4p + 8q$ $= 2p + 8q$	M1 A1
(b) $5ab + a - 3b + 2a - 4b + ba$ $= 6ab + 3a - 7b$	M1

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$10-7ab-(6ab+3a-7b)$ $=10-7ab-6ab-3a+7b$ $=10-13ab-3a+7b$	M1 A1
9(a) $x+2$ (b) $2x+2x+4+x+2=121$ $5x+6=121$ $5x=115$ $x=23$ Therefore, Hafiz has 2(23) + 4 = 50 books	B1 M1 A1
10. $x+10+3x-30=180$ $4x-20=180$ $4x=200$ $x=50$	M1 A1
11. (a) $7x+3x=180$ $10x=180$ $x=18$ (b) $3(18)+3(18)+y=180$ $y=180-54-54$ $y=72$	M1 A1 B1
12. (a) 59 (b) $6n-1$	B1 B1
13 (a) 70% ---- $285	M1

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$100\% \text{ ----- } \frac{285}{70} \times 100$ $= \$407.10$	A1
(b) $\$650\,000 - \$500\,000 = \$150\,000$	M1
$\frac{150000}{500000} \times 100\% = 30\%$	A1
14. 1 unit = \$20	M1
9 units = \$180	A1
15 (a) $\frac{7}{8}$	B1
(b) 48 children ----- 360^0	M1
6 children ----- $\frac{360}{48} \times 6$ $= 45^0$	A1
(c) $\frac{30}{48} \times 100\%$ $= 62.5\%$	B1
16(a) A (-2, 2)	B1
B (1, 3)	B1
(b) Trapezium	B1

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(c) $\frac{1}{2}(2+5)\times 3 = 10.5$ square units (d) $\frac{3-2}{1-(-2)} = \frac{1}{3}$	
17 (a) Area of two semi circles = 3.14 x 5 x 5 = 78.5 cm^2 Total area = 100 + 78.5 = 178.5 cm^2 (b) Circumference of two semi circles = 3.14 x 10 = 31.4 cm Perimeter = 31.4 + 10 + 10 = 51.4 cm	M1 A1 M1 A1
18.(a) Vol = 1.5 x 5 x 3.5 = 26.25 m^3 (b) Surface area of the pool = (2 x 1.5 x 5) + (2 x 1.5 x 3.5) + (5 x 3.5) = 43 m^2 5 m^2 ----- 1 litre 43 m^2 ---- 8.6 litres (c) 3 tins	B1 M1 M1 A1 B1

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SIGLAP SECONDARY SCHOOL

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Mathematics 4016/2

End-of-Year Examination 2011

Secondary One Express

Name : _____ ( ) Date : 14 Oct 2011

Class : _____ Duration : 1 h 30 min

Additional Materials: Answer Papers
Plain Paper (1sheet)
Graph Paper (1sheet)

READ THESE INSTRUCTIONS

Write your name and index number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
Write your answers on the answer space provided.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
At the end of the examination, fasten all your work together securely.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 60.
The use of an electronic calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

Score	/ 60	Parent's Signature	Date

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Answer ALL questions.

1. (a) Bus Service A leaves the Pasir Ris Interchange every 3 minutes. Bus Service B leaves the Pasir Ris Interchange every 5 minutes and Bus Service C leaves the Pasir Ris Interchange every 8 minutes. If all the three bus services first leave the bus interchange at 06 00, at what time would the three buses next leave the interchange together? [3]

(b) Mrs Tan has 3 pieces of ribbons measuring 120 cm, 192 cm and 252 cm respectively. She wants to cut the ribbons into smaller pieces of equal lengths with no remainders.

(i) Find the greatest possible length of each of the smaller pieces of ribbons. [2]

(ii) How many such smaller pieces of ribbons can she get from the original 3 pieces of ribbons? [1]

---

2. Given that $x = -1$, $y = 4$ and $z = 3$, find the value of the following:

(a) $(xy)^2 - 8xz$ [2]

(b) $\frac{xy}{z} - \frac{yz}{x} + \frac{xz}{y}$ [2]

---

3. Simplify the following:

(a) $\frac{x+y}{4} - \frac{2x-y}{5}$ [2]

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

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4. Solve the following equations:

(a) $2x-[9-3(4x-7)]=36$ [3]

(b) $5+\frac{3x-2}{4}=x$ [3]

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5. A train traveled a distance of 625 km in 5 hours and then without stopping, traveled a further distance of 240 km at an average speed of 100 km/hr.

Calculate:

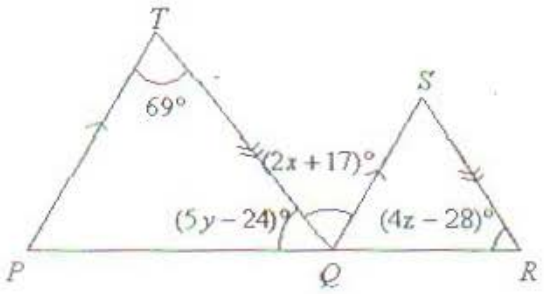
(a) the average speed for the 1st part of the journey. [1]

(b) the time taken, in *hours* and *minutes*, for the second part of the journey. [2]

(c) the average speed for the whole journey. [2]

---

6. In the diagram below, PQR is a straight line and TQ is the angle bisector of $\angle PQS$.



Find the values of

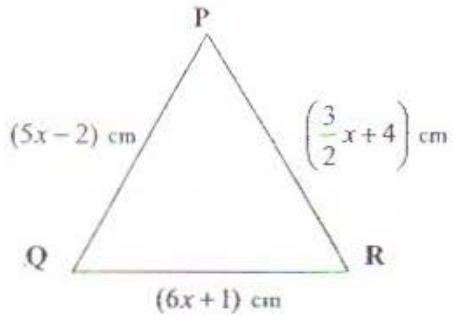
(a) x, [2]

(b) y and [2]

(c) z. [2]

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7. PQR is a triangle in which $PQ = (5x - 2)$ cm, $QR = (6x + 1)$ cm and $PR = \left(\frac{3}{2}x + 4\right)$ cm.



(a) Given that the perimeter of triangle PQR is 53 cm, form an equation in terms of x. [1]

(b) Find the value of x. [2]

(c) Using (b), find the length of the shortest side of the triangle. [1]

---

8. On a piece of blank paper, construct a quadrilateral $ABCD$ such that the base $AB = 9$ cm and $\angle BAD = 85°$, $AD = 7$ cm, $\angle ABC = 75°$ and $CD = 6.8$ cm. [2]

(a) Measure and write down the length of BC. [1]

(b) On your diagram, draw:

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

(ii) the angle bisector of $\angle ADC$. [1]

(c) The perpendicular bisector and the angle bisector meet at X. Measure and write down the length of AX. [1]

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9.



The cross sectional area of the prism shown above is a quadrant of a circle of radius 6 cm and height 31.5 cm. Taking $\pi = \frac{22}{7}$, find

(a) the area of the quadrant, [1]

(b) the volume of the prism, [1]

(c) the total surface area of the prism. [3]

---

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

x	-3	-2	-1	0	1	2	3
y	a	-6	-4	-2	b	2	4

The given table of values is for $y = 2(x-1)$.

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

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

(c) Using your graph,

(i) find the value of x when $y = 5$. [1]

(ii) calculate the gradient of the line. [1]

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11. The pie chart below shows how Hannah spends her allowance of $240 in a particular month.

(a) Calculate:

(i) the amount spent on food. [1]

(ii) the fraction of the amount spent on shopping. [1]

(iii) the percentage of the amount spent on transport. [1]

(b) If she managed to keep $52 as savings, calculate the angle of the sector representing savings. [2]

(c) Given that she spent twice the amount on movies than on storybooks, calculate the amount she spent on movies. [3]



~ *End of Paper* ~

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Sec 1 Express Paper 2 Solutions

1 (a)
$$\begin{array}{r|l} 3 & 3, 5, 8 \\ 5 & 1, 5, 8 \\ 2 & 1, 1, 8 \\ 2 & 1, 1, 4 \\ 2 & 1, 1, 2 \\ & 1, 1, 1 \end{array}$$ [M1]

LCM $= 3 \times 5 \times 2 \times 2 \times 2$
$= 15 \times 8$
$= 120$ *mins*
$= 2$ *hrs* [M1]

0600 + 2 *hrs* → 0800 hrs (8:00 am) [A1]

(b)(i)
$$\begin{array}{r|l} 2 & 120, 192, 252 \\ 2 & 60, 96, 126 \\ 3 & 30, 48, 63 \\ & 10, 16, 21 \end{array}$$ [M1]

10 *cm*, 16 *cm*, 21 *cm* [A1]

(ii) HCF $= 2 \times 2 \times 3$
$= 12$ *pieces* [A1]

2 (a)
$$(xy)^2 - 8xz = (-4)^2 - 8(-1)(3)$$
$$= 16 - (-24)$$
$$= 16 + 24$$ [M1]
$$= 40$$ [A1]

(b)
$$\frac{xy}{z} - \frac{yz}{x} + \frac{xz}{y} = \frac{-4}{3} - \left(\frac{12}{-1}\right) + \left(\frac{-3}{4}\right)$$
$$= -\frac{4}{3} + 12 - \frac{3}{4}$$ [M1]
$$= 9\frac{11}{12}$$ [A1]

3 (a)
$$\frac{x+y}{4} - \frac{2x-y}{5}$$
$$= \frac{5(x+y) - 4(2x-y)}{20}$$

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

$$= \frac{-3x + 9y}{20} \quad \left(\frac{9y - 3x}{20}\right) \quad [A1]$$

(b) $\frac{2(m-1)}{3} + \frac{3(2m-3)}{4}$

$$= \frac{2(4)(m-1)}{12} + \frac{3(3)(2m-3)}{12}$$

$$= \frac{2(4)(m-1) + 3(3)(2m-3)}{12}$$

$$= \frac{8(m-1) + 9(2m-3)}{12}$$

$$= \frac{8m - 8 + 18m - 27}{12} \quad [M1]$$

$$= \frac{26m - 35}{12} \quad [A1]$$

4 (a) $2x - [9 - 3(4x - 7)] = 36$

$2x - [9 - 12x + 21] = 36$

$2x - [30 - 12x] = 36$ [M1]

$2x - 30 + 12x = 36$

$14x = 66$ [M1]

$x = \frac{66}{14}$

$= \frac{33}{7}$

$= 4\frac{5}{7}$ [A1]

4 (b) $5 + \frac{3x - 2}{4} = x$

$\frac{3x - 2}{4} = x - 5$ [M1]

$3x - 2 = 4(x - 5)$

$3x - 2 = 4x - 20$

$3x - 4x = -20 + 2$ [M1]

$-x = -18$

$x = 18$ [A1]

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5. (a) Average Speed = $625 \div 5$
$= 125\ km/hr$ [A1]

(b) Time Taken = $240 \div 100$ [M1]
$= 2.4\ hrs \left(2\frac{2}{5}\ hrs\right)$ [A1]

(c) Distance = $625 + 240$
$= 865\ km$

Time Taken = $5 + 2.4$
$= 7.4\ hrs$

Average Speed = $\frac{864}{7.4}$ [M1]
$= 116.89\ km/hr \left(116\frac{33}{37}\ km/hr\right)$ [A1]

6. (a) $2x + 17 = 69°$
$2x = 52°$ [M1]
$x = 26°$ [A1]

(b) $5y - 24 = 69°$
$5y = 93°$ [M1]
$y = 18.6° \left(18\frac{3}{5}°\right)$ [A1]

(c) $4z - 28 = 69°$
$4z = 97°$ [M1]
$z = 24.25° \left(24\frac{1}{4}°\right)$ [A1]

7. (a) $(5x - 2) + (\frac{3}{2}x + 4) + (6x + 1) = 53$ [A1]

(b) $5x - 2 + \frac{3}{2}x + 4 + 6x + 1 = 53$

$12\frac{1}{2}x + 3 = 53$

$12\frac{1}{2}x = 50$ [M1]

$x = 50 \div 12\frac{1}{2}$

$x = 4$ [A1]

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(c) $(5x-2) = 20-2 = 18\ cm$

$(\frac{3}{2}x+4) = 6+4 = 10\ cm$

$(6x+1) = 24+1 = 25\ cm$

Length of shortest side is 10 cm [A1]

8. (a) Length of BC = 6 cm [A1]

(c) Length of AX = 4.8 cm [A1]

9. (a) Area of quadrant $= \frac{1}{2} \times \pi r^2$

$= \frac{1}{2} \times \frac{22}{7} \times 6 \times 6$ [M1]

$= 28\frac{2}{7}\ cm^2$ $(28.29\ cm^2)$ [A1]

(b) Volume of prism $= 28\frac{2}{7} \times 31.5$

$= 891\ cm^3$ [A1]

(c) Total Surface Area

$= (31.5 \times 6) + (31.5 \times 6) + 28\frac{2}{7} + 28\frac{2}{7} + \left(\frac{1}{4} \times \frac{22}{7} \times 12 \times 31.5\right)$ [M1]

$= 189 + 189 + 28\frac{2}{7} + 28\frac{2}{7} + 297$ [M1]

$= 731\frac{4}{7}\ cm^2$ $(731.57\ cm^2)$ [A1]

10. (a) $a = -12$ [A1]
$b = 0$ [A1]

(c)(i) $x = 2.65$ [A1]
(ii) $gradient = 3$ [A1]

11. (a)(i) $\frac{105}{360} \times 240$

$= \$70$ [A1]

(ii) $\frac{60}{360} = \frac{1}{6}$ [A1]

(iii) $\frac{45}{360} \times 100\%$

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$= 12.5\%$ [A1]

(b) $\frac{52}{240} \times 360°$ [M1]

$= 78°$ [A1]

(c) $\angle$ representing movies and storybooks

$= 360° - 105° - 60° - 78° - 45°$

$= 72°$

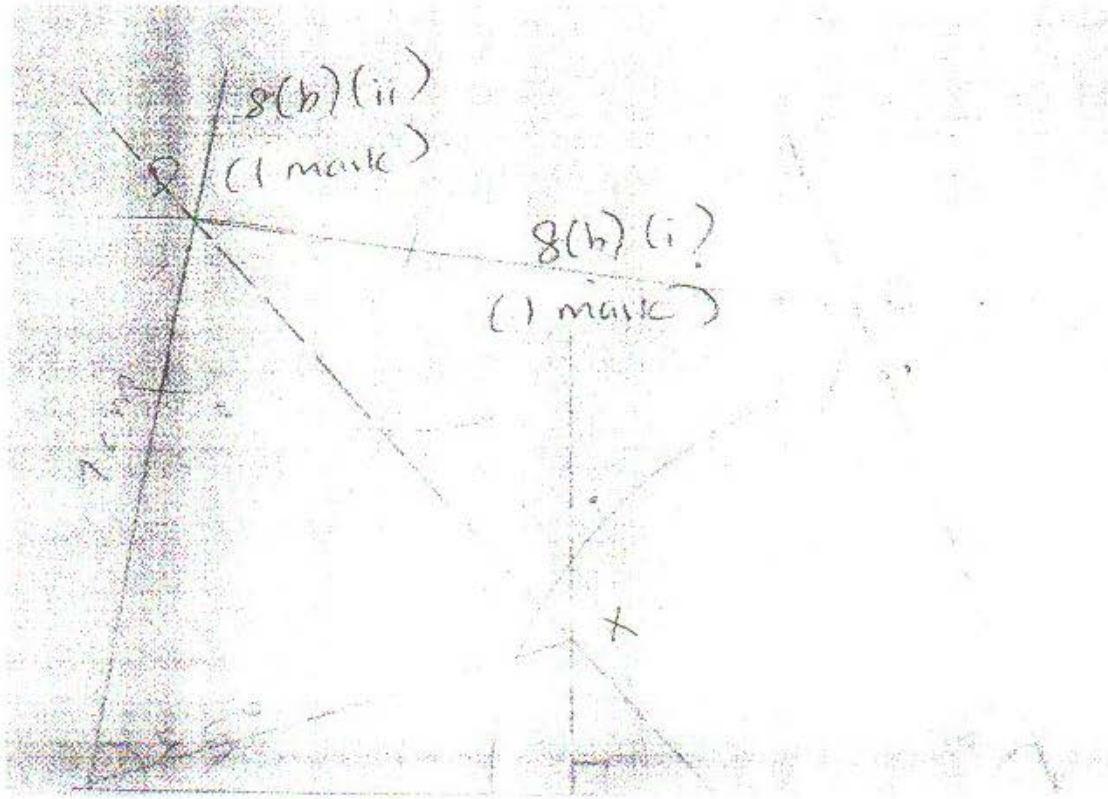
Let x be the $\angle$ representing storybooks
Let $2x$ be the $\angle$ representing movies

$2x + x = 72°$
$3x = 72°$
$x = 72° \div 3$
$x = 24°$

$2x = 2 \times 24 = 48°$

Amount spent on movies
$= \frac{48}{360} \times \$240$ [M1]
$= \$32$ [A1]

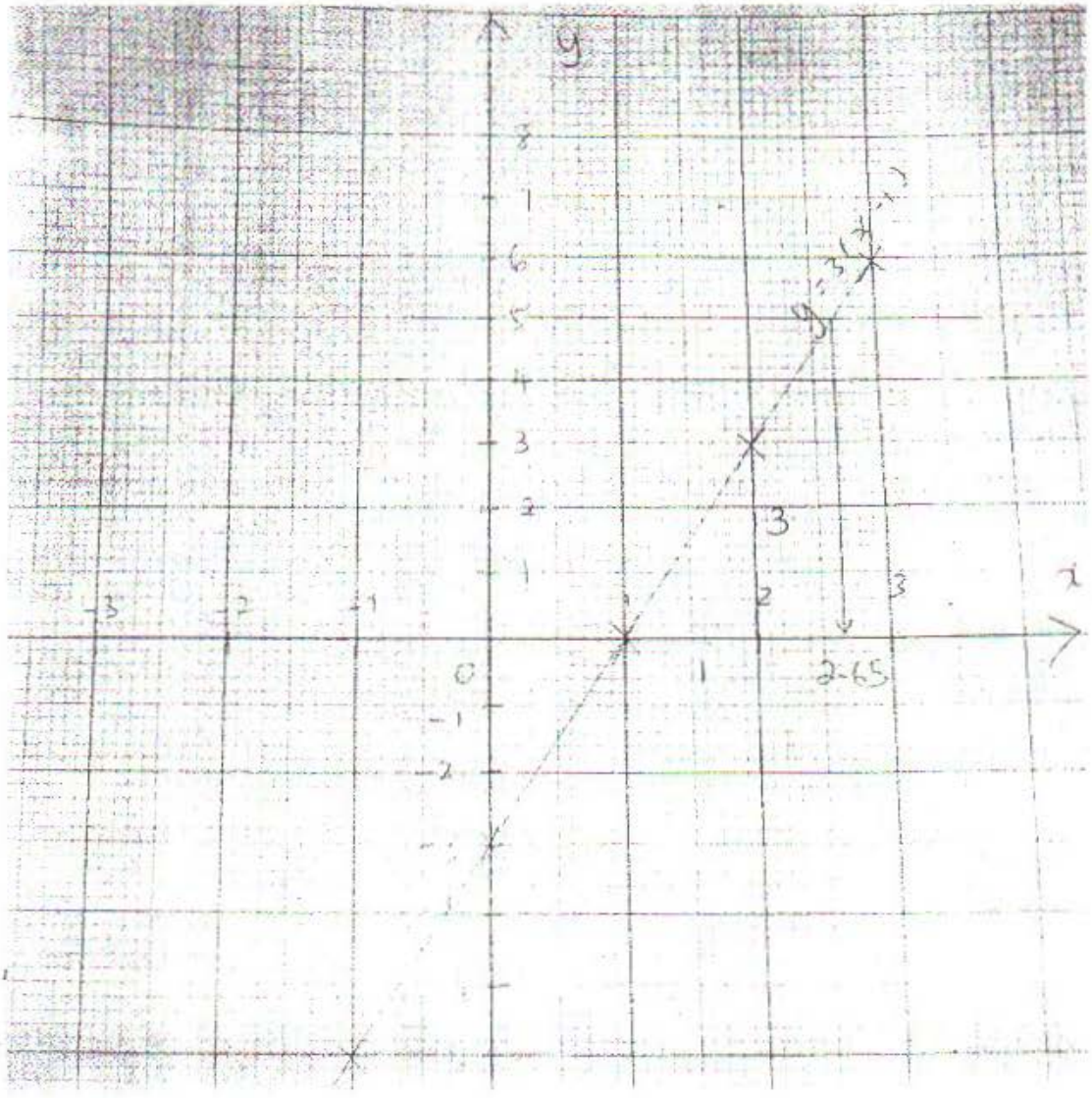
Question 8:



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[1 mark:correct dimensions]
[1 mark:correct diagram]

Question 10:



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