Candidate Name _____

Class	Index Number

YUHUA SECONDARY SCHOOL
MID-YEAR Examination 2011
Secondary One Express

MATHEMATICS

PAPER 1

4016/01

TIME 1 hour 15 minutes

Candidates answer on the Question Paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.

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.
You are expected to use a scientific calculator to evaluate explicit numerical expressions.
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 of the marks for this paper is 50.

For Examiner's Use	
Total	50

This question paper consists of 9 printed pages.

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1. (a) Express 6048 as a product of its prime factors, leaving your answer in index notation.

(b) Find the highest common factor (HCF) of 40, 66 and 788.

Answer (a) _____ [2]

(b) _____ [2]

---

2. A number is given as $a^2 \times b^6$.

(a) Find the square root of this number.

(b) Find the cube of your answer from part (a).

Answer (a) _____ [1]

(b) _____ [1]

---

3. Arrange the numbers $0.7\dot{8}$, 0.78, 0.786 and $0.\dot{7}\dot{8}$ in ascending order

Answer _____ [1]

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4. Consider the following six numbers:

$$\sqrt{36},\ \frac{5}{7},\ 36,\ \pi,\ (-1.3)^3,\ 19$$

Write down the:

(a) prime number.

(b) irrational number.

(c) perfect square number.

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

5. Draw a number line to represent the following numbers:

$$20,\quad -18.5,\quad \frac{21}{2},\quad -\sqrt{49},$$

Answer _____ [1]

---

6. Estimate the value of $\dfrac{\sqrt{65}}{-1.231+4.9876}$.

Answer _____ [2]

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7. A number is approximated to 3 significant figures and its value is given as 92 400.

(a) What is the smallest number it could have been?

(b) If the number is an integer, what is the largest number it could have been?

Answer (a) _____ [1]

(b) _____ [1]

---

8. Round off

(a) 0.045 734 to 3 significant figures.

(b) 9.995 4 to 2 decimal places.

Answer (a) _____ [1]

(b) _____ [1]

---

9. Write an algebraic expression for each of the following.

(a) Subtract $7x$ from the sum of 75 and $9y$.

(b) Add $6a$ to twice the square of $3c$.

Answer (a) _____ [1]

(b) _____ [1]

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10. Find the sum of 3 consecutive odd integers if the greatest odd integer is $2x$.

Answer _____ [2]

---

11. (a) Simplify $10p - \frac{5}{6}q - p + 4q + \frac{1}{3}p - 11r$

(b) Expand and simplify $3(8x - 10y) - 5(3x - 7y)$.

Answer (a) _____ [2]

(b) _____ [2]

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12. Express the following as a single fraction.

$$\frac{2x+3y}{9} - \frac{5y-16}{3}$$

Answer _____ [3]

13. Factorise each of the following:

(a) $36x^2 - 12x$

(b) $6x(x+4)+3(x+4)$

(c) $px - qx - 2qy + 2py$

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [2]

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14. Solve the following equations leaving your answers as mixed fractions.

(a) $3x+22=98$

(b) $\dfrac{9}{7-4p}=\dfrac{2}{3}$

Answer (a) $x=$ _____ [2]

(b) $p=$ _____ [3]

---

15. Given that $a=1, b=-2$ *and* $c=-3$, find the value of the following:

(a) $2a-c^2$

(b) $\dfrac{a+b}{c}-\dfrac{ab-c}{b}$

Answer (a) _____ [1]

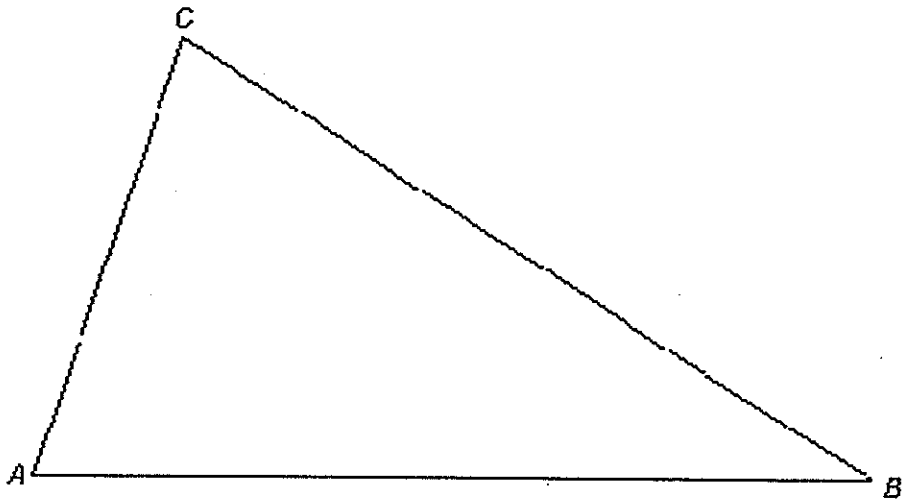
(b) _____ [2]

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16. On the ΔABC given below, construct

(a) the angle bisector of $\angle ABC$, [1]

(b) the perpendicular bisector of BC. [1]

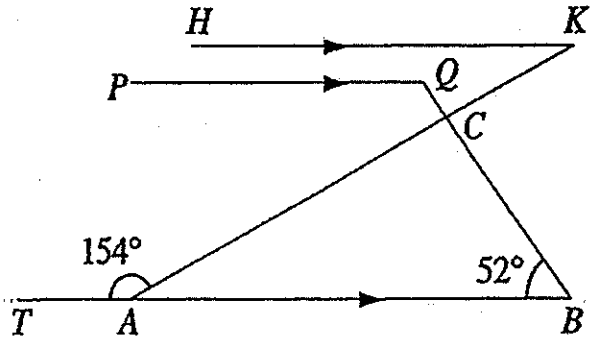


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17. In the diagram below, HK, PQ and AB are parallel, ∠CAT = 154° and ∠ABC = 52°. Calculate, stating your reasons clearly,

(a) ∠HKC

(b) ∠QCK

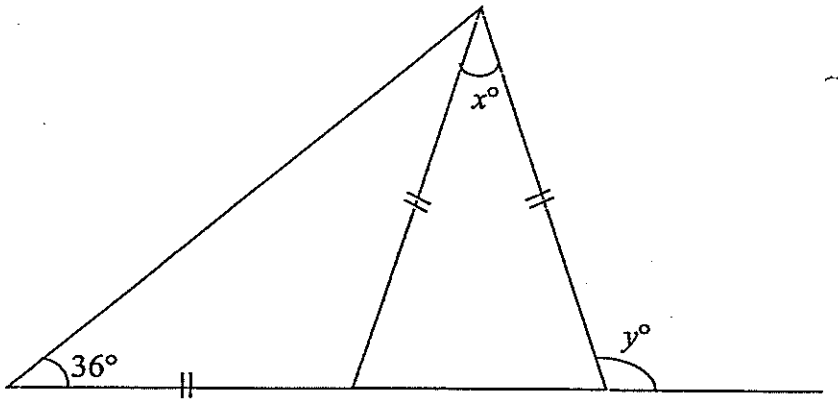


Answer (a) ∠HKC = _____ ° [2]

(b) ∠QCK = _____ ° [2]

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18. Find the values of x and of y in the figure below. State your reasons clearly.



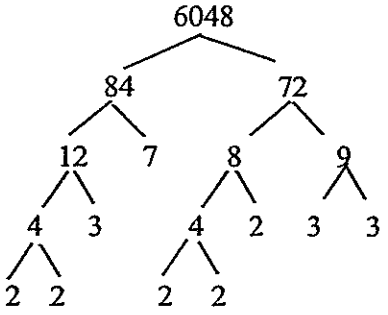
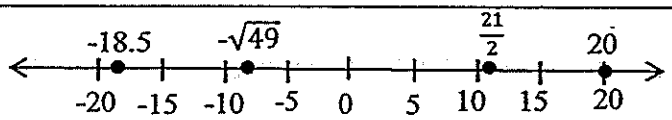
Answer (a) $x =$ _____ [2]

(b) $y =$ _____ [2]

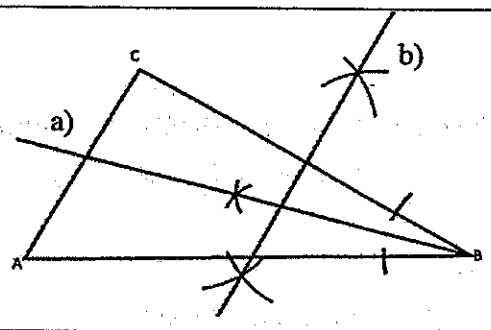
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Mark Scheme

Question No.		Answer	Marks	Total Marks
1	a)	 $2^5 \times 3^3 \times 7$	1 1	4
	b)	2 | 40, 66, 788 | 20, 33, 394 2	1 1	
2	a)	$a \times b^3$	1	2
	b)	$a^3 \times b^9$	1	
3		0.78, 0.786, $0.\dot{7}\dot{8}$, $0.7\dot{8}$	1	1
4	a)	19	1	3
	b)	π	1	
	c)	36	1	
5			1	1
6		$\approx \frac{\sqrt{64}}{-1+5}$ $= 2$	1 1	2
7	a)	92 350	1	2
	b)	92 449	1	
8	a)	0.0457	1	2
	b)	10.00	1	
9	a)	$(75 + 9y) - 7x$	1	2
	b)	$6a + 18c^2$	1	
10		The 3 numbers are $2x$, $2x-2$, $2x-4$. $6x - 6$	1 1	2
11	a)	$= 10p - p + \frac{1}{3}p - \frac{5}{6}q + 4q - 11r$ $= 9\frac{1}{3}p + 3\frac{1}{6}q - 11r$	1 1	4
	b)	$= 24x - 30y - 15x + 35y$ $= 9x + 5y$	1 1	

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12		$=\frac{2x+3y-3(5y-16)}{9}$ $=\frac{2x+3y-15y+48}{9}$ $=\frac{2x-12y+48}{9}$	1 1 1	3
13	a)	$12x(3x-1)$	1	4
	b)	$3(2x+1)(x+4)$	1	
	c)	$=x(p-q)+2y(p-q)$ $=(p-q)(x+2y)$	1 1	
14	a)	$3x=76$ $x=25\frac{1}{3}$	1 1	5
	b)	$2(7-4p)=27$ $14-8p=27$ $-8p=13$ $p=-1\frac{5}{8}$	1 1 1	
15	a)	-7	1	3
	b)	$=\frac{1-2}{-3}-\frac{-2+3}{-2}$ $=\frac{-1}{-3}-\frac{1}{-2}$ $=\frac{5}{6}$	1 1	
16	a)		1	2
	b)		1	
17	a)	$\angle HKC=\angle CAB$ (alt. $\angle s$) $=180°-154°$ (adj. $\angle s$ on a str. line) $=26°$ *Deduct 1 mark if no reason given.	1 1	4
	b)	$\angle QCK=\angle ACB$ (vert. opp. $\angle s$) $=180°-26°-52°$ (Sum $\angle s$ in Δ) $=102°$ *Deduct 1 mark if no reason given.	1 1	
18	a)	$36°+36°=72°$ (isos Δs, ext. $\angle s$) $\therefore x=180°-72°-72°$ (isos Δs, Sum $\angle s$ in Δ) $=36°$	1 1	4
	b)	$y=180°-72°$ (adj $\angle s$ in str. line) $=108°$	1 1	

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Candidate Name _____

Class	Index Number

YUHUA SECONDARY SCHOOL
MID-YEAR Examination 2011
Secondary One Express

MATHEMATICS

4016/02

PAPER 2

TIME 1 hour

Candidates answer on the Question Paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.

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.
You are expected to use a scientific calculator to evaluate explicit numerical expressions.
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 of the marks for this paper is 50.

For Examiner's Use	
Total	/50

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1. Find the lowest common multiple (LCM) of the following:

$3 \times 5^2 \times 7^3 \times 11$ and $2^3 \times 3^3 \times 7^2$

Answer _____ [2]

---

2. Find the square root of 2025 **using prime factorization.**

Answer _____ [2]

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3. Evaluate $\frac{(9.325-9.107)(6.875+1.325)}{\sqrt{4.273}-2.943^3}$, giving your answer correct to 1 decimal place.

Answer (a) _____ [2]

---

4. A stone was on a beach 6 m above the sea level at low tide. At high tide, the stone is 4 m below the sea level.

(a) What is the difference in the sea level between high tide and low tide?

(b) At a certain time, the sea level is exactly in the middle between high tide and low tide. How far is the sea level below the stone at this time?

Answer (a) _____ m [1]

(b) _____ m [1]

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5. (a) There are 2 mistakes in the working below.

(i) CIRCLE the 2 mistakes in the working.

$$[13-4-3(-2)]\div 5+10[5+(-3)]$$
$$=[9-6]\div 5+10(-2)$$
$$=3\div 5+(-20)$$

(ii) REWRITE the correct working and **hence,** evaluate the answer.

(b) Samuel buys 3 pens at 49 cents each and 5 files at $1.99 each at the school bookshop. The shopkeeper asks for $12.42. Show **by using estimation** that the shopkeeper has made a mistake.

Answer (a) (i) on question [2]

(ii) _____

_____

_____

_____

_____

_____ [2]

(b) _____

_____

_____

_____

_____

_____ [2]

_____

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6. Mandy measures the actual volumes of 8 bottles of mineral water. Each bottle is supposed to contain 600 *ml* of mineral water. The table below shows the results of Mandy's measurement.

Bottle	A	B	C	D	E	F	G	H
Volume above or below the required volume (*ml*)	- 4	+ 2	- 3	+ 5	0	- 1	- 2	- 5

(a) Which bottle contains the most accurate volume of mineral water?

(b) Calculate the actual volume of mineral water in Bottle H.

(c) Find the average volume of mineral water in each of the 8 bottles.

Answer (a) Bottle _____ [1]

(b) _____ *ml* [1]

(c) _____ *ml* [2]

---

7. Kate, Faith and Nicole each visit the library once every 3 days, 5 days and 12 days respectively. If they meet at the library today, how many days later will they meet again?

Answer _____ days later [2]

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8. (a) The product of three numbers is $75xy$. If two of the numbers are $2m$ and 15 respectively, find the third number.

(b) Subtract $[4(x-3)+2(3-x)]$ from $5(3x-2)$.

Answer (a) _____ [2]

(b) _____ [4]

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9. (a) Solve the following equation

$$\frac{2x-3}{7}-\frac{3x-4}{5}=-3x$$

(b) Colin went to his school bookshop to buy some pens and erasers. Given that each eraser is \$0.30 cheaper than a pen and Colin spent a total of \$6.60 on 7 pens and 2 erasers. Find the cost of a pen.

Answer (a) _____ [3]

(b) _____ [3]

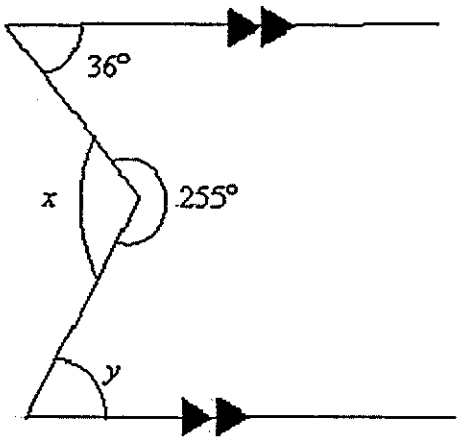
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10. Find the values of angles

(a) x,

(b) y.

State your reasons clearly.

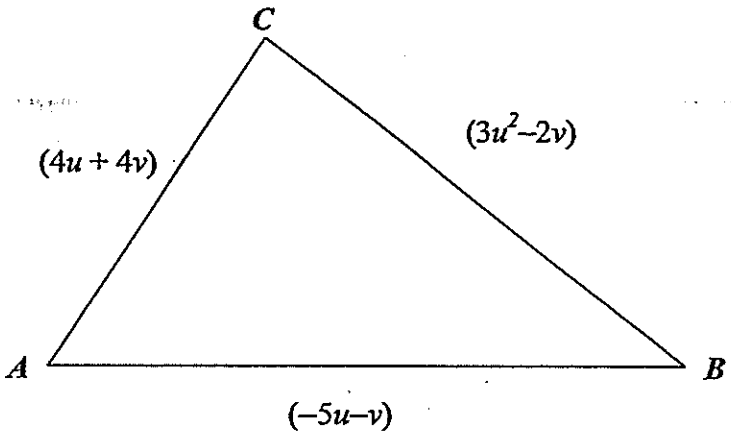


Answer (a) $x =$ _____ ° [2]

(b) $y =$ _____ ° [2]

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11. The lengths of the sides of a triangle ABC are given as $(-5u-v)$ *cm*, $(3u^2-2v)$ *cm* and $(4u+4v)$ *cm*.



(a) If $u=-2$ and $v=3$, find the following lengths of the sides of triangle ABC in *cm*:

(i) AB

(ii) BC

(b) Find the perimeter of the triangle in terms of u and v.

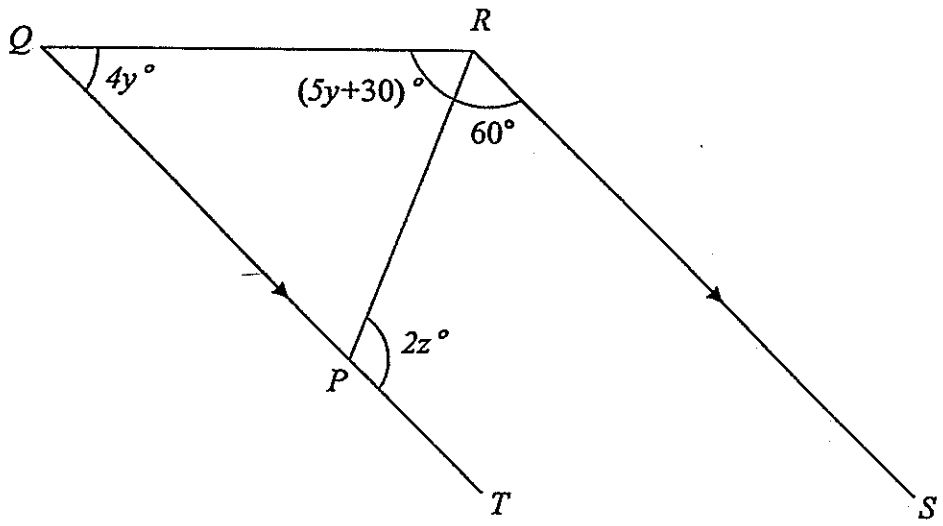
Answer (ai) AB = _____ *cm* [2]

(aii) BC = _____ *cm* [2]

(b) _____ *cm* [3]

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12. In the figure below, $QT \parallel RS$, $\angle PQR = 4y°$, $\angle QRP = (5y+30)°$, $\angle RPT = 2z°$ and $\angle PRS = 60°$.



Find the value of

(a) z,

(b) y.

Answer (a) $z =$ _____ [3]

(b) $y =$ _____ [4]

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Mark Scheme

Question No.		Answer	Marks	Total Marks
1	a)	$3 \mid 3 \times 5^2 \times 7^3 \times 11 \quad , \quad 2^3 \times 3^3 \times 7^2$ $7^2 \mid 5^2 \times 7^3 \times 11 \quad , \quad 2^3 \times 3^2 \times 7^2$ $\mid 5^2 \times 7 \times 11 \quad , \quad 2^3 \times 3^3$ 20 374 200	1 1	3
	b)	10	1	
2		$\therefore 2025 = 3^4 \times 5^2$ 45	1 1	2
3		$\frac{(0.218)(8.2)}{-23.422932}$ $= -0.1$	1 1	2
4	a)	45	1	2
	b)	-32	1	
5	ai)	$= [9 - 6] \div 5 + 10(-2)$	1 each	6
	aii)	$[13 - 4 - 3(-2)] \div 5 + 10[5 + (-3)]$ $= [9 + 6] \div 5 + 10(2)$ $= 23$	 1 1	
	b)	$\approx 50 \times 5 = \$1.50$ $\approx 2 \times 5 = \$10.00$ Total = \$11.50 Since the total cost after estimation cannot be more than \$11.50, the shopkeeper has made a mistake.	1 1	
6	a)	E	1	4
	b)	595	1	
	c)	$= \frac{4792}{8}$ $= 599$	1 1	
7		$3 \mid 3, 5, 12$ $2 \mid 1, 5, 4$ $2 \mid 1, 5, 2$ $5 \mid 1, 5, 1$ $\mid 1, 1, 1$ 60	 1 1	2
8	a)	$15a^4b^2$	1	4
	b)	-2pq	1	
	c)	$\frac{1}{5}x + \frac{1}{5}y - x + y$ $= \frac{1}{5}x - x + \frac{1}{5}y + y$ $= -\frac{4}{5}x + \frac{6}{5}y$	1 1	

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9	a)	$(2m)(15) = 30m$ $\therefore$ Third number $= \frac{75xy}{30m}$ $= \frac{5xy}{2m}$	1 1	5
	b)	$15x - 10 - [4x - 12 + 6 - 2x]$ $= 15x - 10 - (2x - 6)$ $= 15x - 10 - 2x + 6$ $= 13x - 4$	1 1 1	
10	a)	$0.120x + 0.081x = 4.02$ $0.201x = 4.02$ $x = 20$	1 1	5
	b)	$\frac{5(2x-3)-7(3x-4)}{35} = -3x$ $\frac{10x-15-21x+28}{35} = -3x$ $\frac{-11x+13}{35} = -3x$ $11x + 13 = 105x$ $94x = -13$ $x = \frac{-13}{94}$	2 1	
11	a)	$\frac{12x}{5}$ 0.30 $\frac{x}{2}$ $26.10 + x$	1 1	3
	b)	0.80	1	
12	a)	105	1	3
	b)	$180 - 35 = 145°$ (int. $\angle s$, // lines) $255 - 145 = 110°$ $y = 180° - 110°$ (int. $\angle s$, // lines) $= 70°$ *deduct 1 mark from total if no reason given.	1 1	
13	ai)	7	1	4
	aii)	6	1	
	b)	$4u + 4v + 3u^2 - 2v - 5u - v$ $= 3u^2 - u + v$	1 1	
14	a)	$2z = 120$ (int. $\angle s$, // lines) $z = 60$	1 1	5
	b)	$120 = 4y + 5y + 30$ (ext. $\angle s$ of Δ) $9y = 90$ $y = 10$	1 1 1	

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