TOUNDED 1965	SECONDARY ONE EXPRESS SECOND SEMESTRAL EXAMINATION		Ε
Name:	()	Class:

MATHEMATICS

Paper 1

4048/01

Tuesday 3 October 2017

1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in. Write in dark blue or black pen. You may use an HB pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer all the 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.

Electronic Calculators are NOT ALLOWED in this paper.

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.

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 50.



This document consists of 8 printed pages.

Setter: Mr Wilson Wee Vetter: Ms Tan Hui Lan

[Turn over

We Nurture Students to Think, Care and Lead with P.R.I.D.E.

Answer all the questions.

1 State all the irrational number(s) from the following list.

$$\frac{2}{3}, \pi, \sqrt[3]{5}, \frac{22}{7}, 0.0053$$

2 A survey was conducted on 20 shops to find the number of workers they employ. The results of the survey are shown in the bar chart below.



Calculate

(a) the percentage of shops with more than 2 workers,

(b) the total number of workers employed in all 20 shops.

Answer workers [2]

3 Written as the product of its prime factors, $375 = 3 \times 5^3$.

(a) Express 90 as the product of its prime factors.

(b) Hence write down

(i) the LCM of 375 and 90, giving your answer as the product of its prime factors,

(ii) the greatest integer that will divide both 375 and 90 exactly.

4 The stem and leaf diagram below shows the waiting times, in minutes, of some patients in a clinic.

Stem	Leaves
1	56
2	01378
3	0 2 2 2 6
4	1 2 5

Key, 1 5 represents 15 minutes	Key: 1	5 represents	15	minutes
----------------------------------	--------	--------------	----	---------

(a) Find the total number of patients at the clinic.

(b) For these times, find

(i) the mode,

Answer minutes [1]

(ii) the median.

Answer minutes [1]

5 By rounding off each number to 1 significant figure, estimate $\frac{6.29 \times 20.6}{4.12}$.

6 Each year, the value of a painting increases by 10%. If the value of the painting was \$12100 in 2016, find its value in 2014.

Answer \$ [3]

7 Given that a = 2 and b = -3, evaluate $\frac{b^3 - 3a}{4ab}$.

8 Daisy bought 20 cartons of eggs. There were x eggs in each carton.

(a) Write down an expression, in terms of x, for the number of eggs she bought.

(b) When the cartons were opened, she found that y eggs were broken. She placed the unbroken eggs equally into 30 baskets. Write an expression, in terms of x and y, for the number of eggs in each basket.

9 Subtract $3x^2 - 6x + 2$ from $5x^2 - 4x - 3$.

10 Simplify $\frac{2x-5y}{3} + \frac{2x-3y}{4}$.

6

11 Factorise the following completely.

(a) 35ax - 5ay

(b) 2ax+6bx-ay-3by

12 AB, BC and CD are adjacent sides of a regular polygon and $\angle BAC = 20^\circ$.



(a) Calculate the exterior angle of the polygon.

(b) Calculate $\angle ACD$.

13 Worker A can paint a room in 2 hours. Worker B can paint the same room in 4 hours.

Find the time it will take for the room to be painted if both workers paint at the same time.

Answer hours [3] Betty earns 3 times as much as Nick and Nick earns \$200 more than Alfred. 14 If Nick earns \$x, write down an expression, in terms of x, for (a) (i) Alfred's earnings, Answer \$ [1] Betty's earnings, (ii) Answer \$ [1] (iii) the sum of Betty, Nick and Alfred's earnings. Answer \$ [2] (b) If the sum of all their earnings is \$8800, find Nick's earnings.

Answer \$ [2]

15 A group of people was asked how many siblings they have in their family.

8

The results of this survey are summarised in the table below.

Number of siblings	0	1	2	3	4
Frequency	5	10	x	4	1

(a) If the mode is 1, write down the largest possible value of x.

(b) If the median is 2, write down the smallest possible value of x.

(c) If the mean is 1.5, calculate the value of x.

[1]

16 Answer this whole question on a sheet of graph paper.

The variables x and y are connected by the equation y = 3 - 3x. Some corresponding values of x and y are given in the table below.

x	-3	-2	-1	0	1	2	3
y	12	а	6	3	0	-3	-6

(a) Find the value of a.

- (b) Using a scale of 2 cm to represent 1 unit, draw a horizontal x-axis for -3≤x≤3. [3] Using a scale of 1 cm to represent 1 unit, draw a vertical y-axis for -6≤y≤12. On your axis, plot the points given in the table and join them with a straight line.
- (c) Use your graph to find the value of x when y = 8. [1]

END OF PAPER

A CUNDED 1963	SWISS COTTAGE SECONDARY SCHOOL SECONDARY ONE EXPRESS SECOND SEMESTRAL EXAMINATION	L		
Name:		_ ()	Class:

MATHEMATICS

Paper 2

4048/02

Monday 09 October 2017

1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Do not use staples, paper clips, glue or correction fluid.

Answer all the 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.

The use of an approved scientific calculator is expected, 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 number of marks for this paper is 50.



This document consists of 10 printed pages.

Setter: Ms Leung Yan Ru Vetter: Ms Tan Hui Lan

[Turn over

We Nurture Students to Think, Care and Lead with P.R.I.D.E.

[2]

Answer all the questions.

1 A regular polygon has interior angles of 156°.

Find the number of sides of the polygon.

Answer

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

(a) $\frac{\left(-\frac{2}{3}\right)^3}{7.2386-2.3412}$

Answer [1]	Answer		[1]
------------	--------	--	-----

(b) $\sqrt{2} + 3\sqrt{5} - 1.273$.

Answer [1]

3 Consider the number sequence 7, 4, 1, -2, -5,,,

Write down

(a) the next two terms,

(b) an expression for the *n*th term,

Answer
$$T_n = \dots$$
 [1]

(c) the 53th term.

BP~321

Jack packs 726 boxes of chocolates, 660 bottles of wine and 693 tins of cookies into gift hampers.
 Each gift hamper contains an equal number of chocolates, wine and cookies.

Find the greatest possible number of gift hampers he could pack.

5 Two telecommunications service providers, Star Mobile and Sing Mobile offer the following mobile price plans for a 32 GB jphone 7.

Star Mobile Combo 3	Sing Mobile 4G3
3GB data/200 minutes outgoing talktime	3GB data/200 minutes outgoing talktime
jphone price \$378	jphone price \$561
Subscription rate \$62.90/month	Subscription rate \$42.90/month

*mobile price plans are valid for 2 years

Which service provider offers a mobile price plan which is more value for money? Support your answer with valid mathematical working.

6 (a) Solve
$$\frac{5x}{3} > 1.2 + \frac{2x}{11}$$
.

(b) Hence, write down the smallest prime number x which satisfies $\frac{5x}{3} > 1.2 + \frac{2x}{11}$.

Answer Smallest Prime = [1]

7 In 2015, a supermarket employs 168 workers consisting of shelf stockers, cashiers, managers in the ratio of 7: 4: 3.

(a) Find the number of cashiers employed in 2015.

Well strate experience

(b) The number of managers employed in 2015 is 20% more than in 2014.

Find the number of managers employed in 2014.

8 Solve

(a) 2(5x+13) = 3(x+1)+2,

(b)
$$\frac{4y}{5} - \frac{2y+1}{3} = \frac{1}{7}.$$

[2]

9 (a) Plot the points of the trapezium ABCD, where the ordered pairs are A(-3, 6), B(5, 6), C(7, -3), D(-7, -3) on the grid below.



(b) Find the gradient of AD.

(c) Calculate the area of trapezium ABCD.

10 An athlete taking part in a dualthlon runs a distance of 800 m at an average speed of 6 km/h. He stops to rest for 10 minutes before he cycles a further distance of 2 km in 12 minutes.

Calculate

(a) the time, in minutes, he takes to run the distance of 800 m,

Answer minutes [2]

(b) his cycling speed in km/h,

(c) his average speed for the whole race.

11



In the diagram, AF is parallel to BC and AB is parallel to DE. AEF is a straight line. Angle $CBE = 42^\circ$, angle $BCD = 53^\circ$ and angle $DEF = 112^\circ$.

Stating your reasons clearly, find

(a) angle EAB,

Answer Angle $EAB = \dots$ [1]

(b) angle BED,

Answer Angle BED = [2]

(c) reflex angle EDC.

Answer Reflex Angle $EAB = \dots$ [3]

BP~327



9

The diagram shows a prism with a cross section that consists of a semicircle and a rectangle with dimensions 8 cm by 5 cm. The prism has a height of h cm.

(a) Calculate the cross sectional area of the solid.



A round cylindrical hole with a diameter of 2 cm is removed from the cuboid to form the artifact as shown above.

(i) Given that the volume of the artifact is 560 cm^3 , show that h = 9.034 cmcorrect to four significant figures. [3] Answer

(ii) Hence, find the total surface area of the artifact.

Answer cm^3 [3]

END OF PAPER

Marking Scheme for Math 1E SA2 P1 2017

Qn	Marking Point	Marks Awarded	Remarks
1a	<i>π</i> , ³ √5	B1	
20	6		
24	Percentage = $\frac{0}{20} \times 100\%$ = 30%	M1 A1	
2b	Total number = $1 \times 6 + 2 \times 8 + 3 \times 4 + 4 \times 2$ = 42	M1 A1	
3a	$ \begin{array}{c} 2 90 \\ 3 45 \\ 3 15 \\ 5 5 \\ 1 \end{array} $		
	$90 = 2 \times 3 \times 3 \times 5 = 2 \times 3^2 \times 5$	B1	
361	$375 = 3 \times 5 \times 5 \times 5$ $90 = 2 \times 3 \times 3 \times 5$ $LCM = 2 \times 3 \times 3 \times 5 \times 5 \times 5$		
	$= 2 \times 3^2 \times 5^3$	B1	
3011	$HCF = 3 \times 5$ $= 15$	B1	
49	15 natients	R1	
Abi	32 minutes	R1	
4bii	30 minutes	BI	
5	$\frac{6.29 \times 20.6}{4.12}$		
	$\approx \frac{0 \times 20}{4}$	M1	
	= 30	A1	
6	Value of painting in 2015 $=\frac{100}{110} \times 12100$ = \$11000	M1	
	Value of painting in 2014 $=\frac{100}{110} \times 11000$ = \$10000	M1 A1	

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \frac{-3a}{3ab} = \frac{-3^{3} - 3(2)}{4(2)(-3)} = \frac{-27 - 6}{-24} = \frac{-33}{-24} = \frac{-33}{-$	-			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\frac{-3j^3 - 3(2)}{4(2)(-3)}$ M1 Evaluation of b^3 $\frac{-27 - 6}{-24}$ M1 Evaluation of b^3 $\frac{-33}{-24}$ M1 Evaluation of b^3 $\frac{-3}{-24}$ M1 Form expression $\frac{-2}{-4x-3} - (3x^2 - 6x + 2)$ M1 Form expression $\frac{x^2 - 4x - 3 - 3x^2 + 6x - 2}{3}$ M1 Converting both fractions to same denominator $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expressions $\frac{4(2x - 2y) + 6x - 9y}{12}$ M1 Expansion of expressions	7	$b^3 - 3a$		
$= \frac{(-3)^{3} - 3(2)}{4(2)(-3)}$ $= \frac{-27 - 6}{-24}$ $= 1\frac{3}{8}$ M1 Evaluation of b^{3} $= \frac{-33}{-24}$ $= 1\frac{3}{8}$ A1 8a No. of eggs in each carton = x No. of eggs in each carton = x No. of eggs bought = $20 \times x$ $= 20x$ B1 8b No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^{2} - 4x - 3 - (3x^{2} - 6x + 2)$ $= 5x^{2} - 4x - 3 - 3x^{2} + 6x - 2$ $= 2x^{2} + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ M1 Evaluation of b^{3} M1 Evaluation of expression A1 A1 A1 A1 A1 A1 A1 A	$ \frac{-3)^{3} - 3(2)}{4(2)(-3)} \\ \frac{-27 - 6}{-24} \\ \frac{-33}{-24} \\ \frac{3}{8} \\ A1 $ Evaluation of b^{3} $ \frac{3}{8} \\ A1 $ Form expression $ \frac{-3)^{3} - 3(2)}{-24} \\ \frac{3}{2} \\ \frac{3}{8} \\ A1 $ Evaluation of b^{3} $ \frac{3}{8} \\ A1 $ Form expression $ \frac{-3}{2} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-3}{-3} \\ -3 \\ \frac{-2}{2} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-2}{4} \\ \frac{-2}{-3} \\ \frac{-3}{(3x^{2} - 6x + 2)} \\ \frac{-2}{30} \\ B1 $ Form expression $ \frac{-3}{30} \\ B1 $ Form expression $ \frac{-3}{30} \\ \frac{-2}{30} \\ B1 $ Form expression $ \frac{-2}{30} \\ B1 $ Converting both fractions to same denominator $ \frac{-2}{30} \\ $		4 <i>ab</i>		
$= \frac{-27 - 6}{-24}$ $= \frac{-33}{-24}$ $= 1\frac{3}{8}$ No. of eggs in each carton = x No. of eggs in each carton = x No. of eggs broken = 20 x $= 20x$ B1 B0 No. of eggs in each basket = $\frac{20x - y}{30}$ B1	$4(2)(-3)$ M1Evaluation of b^3 -33 -33 A1 -33 -34 A1 38 A1 $a0$ feggs in each carton $=x$ $a1$ $a0$ feggs bought $= 20 \times x$ $= 20x$ $= 20x$ B1 $a0$ feggs broken $= y$ $a1$ $a0$ feggs in each basket $= \frac{20x - y}{30}$ B1 $a0$ feggs in each basket $= \frac{20x - y}{30}$ B1 $a0$ feggs in each basket $= \frac{20x - y}{30}$ B1 $a1$ Form expression $a2 + 4x - 3 - (3x^2 - 6x + 2)$ M1 $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $a1$ Converting both fractions to same denominator $a1$ $a2x - 20y + 6x - 9y$ $a2x - 20y + 6x - 9y$ M1 $a1$ Expansion of expressions $a1$ $a1$		$(-3)^3 - 3(2)$		14
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	MI $\frac{-27-6}{-24}$ $\frac{-24}{-24}$ $\frac{3}{3}$ $\frac{3}{8}$ AI Form expression $\frac{-27-6}{-24}$ $\frac{-24}{-24}$ $\frac{3}{-24}$ $\frac{3}{-24}$ AI Form expression $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI $\frac{-20x}{-20x}$ BI Converting both fractions to same denominator $\frac{-27-6}{-24}$ AI Converting both fractions to same denominator $\frac{-27-6}{-24}$ AI $\frac{-20x}{-20y+6x-9y}$ AI $\frac{-20x}{-20x}$ AI $\frac{-20x}{-20x}{-20x}$ AI $\frac{-20x}{-20x}$ AI $\frac{-20x}{-20x}$ AI -		$=\frac{4(2)(-3)}{4(2)(-3)}$		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$M1$ Evaluation of b^3 $\frac{-33}{-24}$ $\frac{3}{8}$ A1 Evaluation of b^3 $\frac{-33}{-24}$ $\frac{3}{8}$ A1 Evaluation of b^3 $\frac{3}{8}$ A1 $\frac{-3}{-24}$ $\frac{3}{8}$ A1 $\frac{-3}{-24}$ $\frac{3}{8}$ A1 $\frac{-3}{-24}$ $\frac{-3}{-24}$ $\frac{-20x}{-20x}$ B1 $\frac{-3}{-20x}$		27 6		
$ \frac{-24}{=\frac{-33}{-24}} = \frac{-33}{-24} $ $= 1\frac{3}{8}$ No. of eggs in each carton = x No. of eggs in each carton = x No. of eggs bought = $20 \times x$ $= 20x$ B1 8b No. of eggs broken = y No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ $= 2x^2 + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ $= \frac{14x - 29y}{12}$ M1 Drawnon of eggs in each basket = $\frac{10}{12}$ M1 $\frac{10}{12}$	$\begin{array}{c c} -24 \\ -33 \\ -33 \\ -24 \\ 38 \\ \hline \\ 12 \\ \hline \\ \\ \\ 12 \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$		$=\frac{-27-0}{24}$	M1	Evaluation of h^3
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\frac{-33}{224}$ $\frac{3}{8}$ A1 of eggs in each carton = x of eggs bought = $20 \times x$ = 20x B1 of eggs broken = y of eggs in each basket = $\frac{20x - y}{30}$ B1 $\frac{1}{2} - 4x - 3 - (3x^2 - 6x + 2)$ $\frac{1}{2}x^2 - 4x - 3 - 3x^2 + 6x - 2$ $\frac{1}{2}x^2 + 2x - 5$ $\frac{1}{2}x^2 + 2x - 5$ $\frac{1}{2}x^2 - 2y + 3(2x - 3y)}{12}$ $\frac{1}{2}$ $\frac{1}{2}x^2 - 2y + 6x - 9y}{12}$ $\frac{1}{2}$ M1 Converting both fractions to same denominator Same denominator M1 Expansion of expressions A1 $\frac{1}{2}$ $\frac{1}{2}x^2 - 2y}$ $\frac{1}{2}$ A1 $\frac{1}{2}$ $\frac{1}{2$		- 24	174.4	Evaluation of b
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		$=\frac{-33}{-33}$		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$\frac{3}{8}$ A1. of eggs in each carton = x <th></th> <th>-24</th> <th></th> <th></th>		-24		
Image: Problem in the system is a constrained of the system is a constrelating thensite. The system is a constrained of the	$\overline{8}$ A1. of eggs in each carton = xof eggs bought = $20 \times x$ $= 20x$ B1of eggs broken = yof eggs unbroken = $20x - y$ of eggs in each basket = $\frac{20x - y}{30}$ B1 $\overline{2}^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $\overline{2}^2 - 4x - 3 - 3x^2 + 6x - 2$ M1 $\overline{2}^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $\overline{2}^2 + 2x - 5$ M1 $\overline{2x^2 + 2x - 5}$ M1 $\overline{4(2x - 5y)} + \frac{3(2x - 3y)}{12}$ M1 $4(2x - 5y) + 3(2x - 3y)$ 12 $3x - 20y + 6x - 9y$ M1 12 41 Expansion of expressions		_13		
8aNo. of eggs in each carton = x = 20xB18bNo. of eggs bought = $20 \times x$ = $20x$ B18bNo. of eggs broken = y No. of eggs in each basket = $\frac{20x - y}{30}$ B19 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ = $5x^2 - 4x - 3 - 3x^2 + 6x - 2$ = $2x^2 + 2x - 5$ M1 A110 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 20y + 6x - 9y)}{12}$ = $\frac{14x - 29y}{12}$ M1 A1Converting both fraction same denominator	. of eggs in each carton = xB1. of eggs bought = $20 \times x$ = $20x$ B1. of eggs broken = yB1. of eggs unbroken = $20x - y$ B1. of eggs in each basket = $\frac{20x - y}{30}$ B1 $\frac{a}{2} - 4x - 3 - (3x^2 - 6x + 2)$ M1 $\frac{a}{2} - 4x - 3 - (3x^2 - 6x + 2)$ M1 $\frac{a}{2} - 4x - 3 - (3x^2 - 6x + 2)$ M1 $\frac{a}{2} - 4x - 3 - (3x^2 - 6x + 2)$ M1 $\frac{a}{2} - 4x - 3 - 3x^2 + 6x - 2$ A1 $\frac{a}{2x^2 + 2x - 5}$ M1 $\frac{a}{2x^2 - 5y + 3(2x - 3y)}{12}$ M1 $\frac{a}{2x - 20y + 6x - 9y}{12}$ M1 $\frac{a}{2x - 20y + 6x - 9y}{12}$ M1 $\frac{a}{2x - 20y + 6x - 9y}{12}$ A1		$=1\frac{1}{8}$	A1	
8aNo. of eggs in each carton = x = 20xB1No. of eggs bought = $20 \times x$ = $20x$ B18bNo. of eggs broken = y No. of eggs in each basket = $\frac{20x - y}{30}$ B19 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ = $5x^2 - 4x - 3 - 3x^2 + 6x - 2$ = $2x^2 + 2x - 5$ M1 A110 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{8x - 20y + 6x - 9y}{12}$ M1 Converting both fraction same denominator $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 29y + 6x - 9y)}{12}$ M1 L	of eggs in each carton = xB1a. of eggs bought = $20 \times x$ $= 20x$ b. of eggs broken = yB1b. of eggs unbroken = $20x - y$ B1b. of eggs in each basket = $\frac{20x - y}{30}$ B1 $2^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $2^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $2x^2 + 2x - 5$ A1 $2x^2 + 2x - 5$ M1 $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ M1 $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $\frac{4(2x - 20y + 6x - 9y)}{12}$ M1Expansion of expressions				
No. of eggs bought = $20 \times x$ = $20x$ B1 8b No. of eggs broken = y B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ = $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ = $5x^2 - 4x - 3 - 3x^2 + 6x - 2$ = $2x^2 + 2x - 5$ M1 Form expression 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ = $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Converting both fraction same denominator and Expansion of expression A1	b. of eggs bought = $20 \times x$ = $20x$ B1 b. of eggs broken = y b. of eggs in each basket = $\frac{20x - y}{30}$ B1 $\frac{1}{2} - 4x - 3 - (3x^2 - 6x + 2)$ $\frac{1}{30}$ B1 $\frac{1}{2} - 4x - 3 - (3x^2 - 6x + 2)$ $\frac{1}{30}$ B1 $\frac{1}{2} - 4x - 3 - (3x^2 - 6x + 2)$ $\frac{1}{2}$ $\frac{1}$	8a	No. of eggs in each carton $= x$		
No. of eggs bought = $20 \times x$ B1 8b No. of eggs broken = y No. of eggs unbroken = $20x - y$ No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ A1 $= 5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ A1 $= 2x^2 + 2x - 5$ A1 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ A1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12} + \frac{3(2x - 3y)}{12}$ M1 Converting both fraction same denominator $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ A1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ A1	b) of eggs bought = $20 \times x$ = 20x B1				
= 20x B1 8b No. of eggs broken = y No. of eggs unbroken = $20x - y$ No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $= 5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ A1 $= 5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ A1 $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $= 2x^2 + 2x - 5$ A1 10 $\frac{2x - 5y}{12} + \frac{3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Converting both fraction same denominator $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ A1 $= \frac{4(2x - 2y + 6x - 9y}{12}$ A1	$= 20x$ B1 $= 20x$ $= 20x$ y b) of eggs broken = y b) of eggs unbroken = $20x - y$ b) of eggs in each basket = $\frac{20x - y}{30}$ B1 $= \frac{20x - y}{30}$ B1 $= \frac{1}{2} + \frac{2x - 3 - (3x^2 - 6x + 2)}{30}$ B1 $= \frac{1}{2} + \frac{2x - 3y}{4}$ $= \frac{x^2 - 4x - 3 - 3x^2 + 6x - 2}{4}$ $= \frac{x^2 - 4x - 3}{4}$		No.of eggs bought = $20 \times x$		
8b No. of eggs broken = y No. of eggs unbroken = $20x - y$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 Form expression $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 Image: Converting both fraction same denominator 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ M1 Converting both fraction same denominator $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 Expansion of expression	$\frac{20x}{9} = \frac{20x}{9}$ of eggs broken = $\frac{y}{30}$ $\frac{20x - y}{30}$ B1 $\frac{y}{2} = 4x - 3 - (3x^2 - 6x + 2)$ $\frac{y}{30}$ B1 $\frac{y}{2} = 4x - 3 - (3x^2 - 6x + 2)$ $\frac{y}{3x^2 - 4x - 3 - 3x^2 + 6x - 2}$ $\frac{x^2 + 2x - 5}{4}$ $\frac{x - 5y}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{12}{12}$ $\frac{3x - 20y + 6x - 9y}{12}$ $\frac{14x - 29y}{12}$ A1 $\frac{x - 29y}{12}$ $\frac{x - 29}{12}$ $\frac{x - 29}$	1	=20r	B1	
No. of eggs in each basket = $\frac{20x - y}{30}$ 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ $= 2x^2 + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 2y) + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ M1 Expansion of expression	b) of eggs unbroken = $20x - y$ b) of eggs in each basket = $\frac{20x - y}{30}$ $\frac{1}{2^2 - 4x - 3 - (3x^2 - 6x + 2)}{30}$ $\frac{1}{2^2 - 4x - 3 - (3x^2 - 6x + 2)}{30}$ $\frac{1}{3x^2 - 4x - 3 - 3x^2 + 6x - 2}{41}$ $\frac{1}{2x^2 + 2x - 5}$ MI Form expression A1 Converting both fractions to same denominator $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{12}{3x - 20y + 6x - 9y}{12}$ $\frac{12}{12}$ $\frac{14x - 29y}{12}$ A1 A1	8b	No. of eggs broken = v		
No. of eggs unbroken = $20x - y$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 Form expression $= 5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ A1 Form expression $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $= 2x^2 + 2x - 5$ A1 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ M1 $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ A1	b. of eggs unbroken = $20x - y$ b. of eggs in each basket = $\frac{20x - y}{30}$ $a^2 - 4x - 3 - (3x^2 - 6x + 2)$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 + 2x - 5$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 + 2x - 5$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 + 2x - 5$ $bx^2 + 2x - 5$				
No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 Form expression $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 Image: state stat	b. of eggs in each basket = $\frac{20x - y}{30}$ $a^2 - 4x - 3 - (3x^2 - 6x + 2)$ $bx^2 - 4x - 3 - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3y - 3x^2 + 6x - 2$ $bx^2 - 4x - 3x - 3x - 3x^2 + 6x - 2$ $bx^2 - 4x - 3x - 3x - 3x^2 + 6x - 2$ $bx^2 - 4x - 3x - 3x - 3x - 3x - 3x - 3x - 3x$		No. of eggs unbroken = $20x - v$		
No. of eggs in each basket = $\frac{20x - y}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $= 2x^2 + 2x - 5$ A1 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ M1 $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{14x - 29y}{12}$ A1	b. of eggs in each basket = $\frac{20x - y}{30}$ B1 $\frac{y^2 - 4x - 3 - (3x^2 - 6x + 2)}{5x^2 - 4x - 3 - 3x^2 + 6x - 2}$ $5x^2 - 4x - 3 - 3x^2 + 6x - 2$ $2x^2 + 2x - 5$ $\frac{x - 5y}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{3x - 20y + 6x - 9y}{12}$ $\frac{12}{12}$ $\frac{14x - 29y}{12}$ A1 B1 Form expression M1 Converting both fractions to same denominator Expansion of expressions A1				
No. of eggs in each basket = $\frac{-1}{30}$ B1 9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ M1 $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ A1 $= 2x^2 + 2x - 5$ A1 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ Expansion of expression $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ M1 $= \frac{4(2x - 29y)}{12}$ A1	B1 B1 B1 B1 B1 B1 B1 B1 B1 B1		20x - v	a	and the first state of the stat
9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ $= 2x^2 + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 2y) + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ A1 Expansion of expression	$\frac{x^{2} - 4x - 3 - (3x^{2} - 6x + 2)}{5x^{2} - 4x - 3 - 3x^{2} + 6x - 2}$ $\frac{M1}{5x^{2} - 4x - 3 - 3x^{2} + 6x - 2}$ $\frac{A1}{2x^{2} + 2x - 5}$ $\frac{x - 5y}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{12}{12}$ $\frac{3x - 20y + 6x - 9y}{12}$ $\frac{14x - 29y}{12}$ $A1$ $K1$ $Expansion of expressions$		No. of eggs in each basket = $\frac{30}{30}$	B1	
9 $5x^2 - 4x - 3 - (3x^2 - 6x + 2)$ $= 5x^2 - 4x - 3 - 3x^2 + 6x - 2$ $= 2x^2 + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 2y) + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ M1 Converting both fraction same denominator M1 Expansion of expression	$\frac{x^{2} - 4x - 3 - (3x^{2} - 6x + 2)}{5x^{2} - 4x - 3 - 3x^{2} + 6x - 2}$ $\frac{M1}{A1}$ Form expression $\frac{A1}{A1}$ Form expression $\frac{x - 5y}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{4(2x - 29y + 6x - 9y}{12}$ $\frac{14x - 29y}{12}$ $\frac{14x - 29y}{12}$ $A1$				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\frac{4x^{2}-9}{6x^{2}-4x-3-3x^{2}+6x-2}{A1}$ A1 $\frac{x-5y}{3} + \frac{2x-3y}{4}$ $\frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ A1 M1 Converting both fractions to same denominator M1 Expansion of expressions A1 M1 Expansion of expressions A1 M1 Expansion of expressions A1 M1 Expansion of expressions A1 A1 A1 A1 A1 A1 A1 A	9	$5r^2 - 4r - 3 - (3r^2 - 6r + 2)$	M1	Form expression
$= 5x^{2} - 4x - 3 - 3x^{2} + 6x - 2$ $= 2x^{2} + 2x - 5$ A1 $\frac{10}{2x - 5y} = \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ A1	A1 $\frac{5x^{2} - 4x - 3 - 3x^{2} + 6x - 2}{2x^{2} + 2x - 5}$ A1 $\frac{x - 5y}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{12}{12}$ $\frac{3x - 20y + 6x - 9y}{12}$ A1 Expansion of expressions A1	-	5x - 4x - 5 - (5x - 6x + 2)		
$= 2x^{2} + 2x - 5$ 10 $\frac{2x - 5y}{3} + \frac{2x - 3y}{4}$ $= \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ A1	$\frac{2x^{2} + 2x - 5}{3} + \frac{2x - 3y}{4}$ $\frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{4(2x - 5y) + 3(2x - 3y)}{12}$ $\frac{3x - 20y + 6x - 9y}{12}$ $\frac{14x - 29y}{12}$ A1 KI $Converting both fractions to same denominator KI Expansion of expressions$		$=5x^2 - 4x - 3 - 3x^2 + 6x - 2$	A1	
10 $\frac{2x-5y}{3} + \frac{2x-3y}{4}$ $= \frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $= \frac{4(2x-5y)+3(2x-3y)}{12}$ $= \frac{4(2x-5y)+3(2x-3y)}{12}$ $= \frac{8x-20y+6x-9y}{12}$ $= \frac{14x-29y}{12}$ A1	$\frac{x-5y}{3} + \frac{2x-3y}{4}$ $\frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ M1 Converting both fractions to same denominator Expansion of expressions A1		$=2x^{2}+2x-5$		
$ \begin{array}{ c c c c c c } \hline 10 & \frac{2x-5y}{3} + \frac{2x-3y}{4} \\ &= \frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12} \\ &= \frac{4(2x-5y)+3(2x-3y)}{12} \\ &= \frac{4(2x-5y)+3(2x-3y)}{12} \\ &= \frac{8x-20y+6x-9y}{12} \\ &= \frac{14x-29y}{12} \\ \hline \mathbf{A1} \\ \end{array} $ M1 Converting both fraction same denominator $ \begin{array}{c} \mathbf{M1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1} \\ \mathbf{K2} \\ \mathbf{K1} \\ \mathbf{K1}$	$\frac{x-5y}{3} + \frac{2x-3y}{4}$ $\frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ M1 Converting both fractions to same denominator Expansion of expressions A1				
$\begin{vmatrix} \overline{3} + \overline{4} \\ = \frac{4(2x - 5y)}{12} + \frac{3(2x - 3y)}{12} \\ = \frac{4(2x - 5y) + 3(2x - 3y)}{12} \\ = \frac{8x - 20y + 6x - 9y}{12} \\ = \frac{14x - 29y}{12} \end{vmatrix}$ M1 Converting both fraction same denominator M1 Expansion of expression	$\frac{3}{4} + \frac{4}{4}$ $\frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ A1 M1 Converting both fractions to same denominator Expansion of expressions	10	2x-5y, $2x-3y$		
$= \frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $= \frac{4(2x-5y)+3(2x-3y)}{12}$ $= \frac{8x-20y+6x-9y}{12}$ $= \frac{14x-29y}{12}$ A1	$\frac{4(2x-5y)}{12} + \frac{3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ A1 Converting both fractions to same denominator Expansion of expressions		$\frac{-1}{3} + \frac{-1}{4}$		
$= \frac{4(2x-5y) + 3(2x-3y)}{12}$ $= \frac{4(2x-5y) + 3(2x-3y)}{12}$ $= \frac{8x - 20y + 6x - 9y}{12}$ $= \frac{14x - 29y}{12}$ A1	$\frac{1}{12} + \frac{1}{12}$ $\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ A1 same denominator Expansion of expressions		4(2x-5y) = 3(2x-3y)	M1	Converting both fractions to
$\begin{vmatrix} 12 & 12 \\ = \frac{4(2x-5y)+3(2x-3y)}{12} \\ = \frac{8x-20y+6x-9y}{12} \\ = \frac{14x-29y}{12} \end{vmatrix}$ M1 Expansion of expression	$\frac{4(2x-5y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ A1 Expansion of expressions		$=\frac{1}{12}+\frac{1}{12}$		same denominator
$\begin{vmatrix} = \frac{4(2x-3y)+3(2x-3y)}{12} \\ = \frac{8x-20y+6x-9y}{12} \\ = \frac{14x-29y}{12} \\ = \frac{14x-29y}{12} \\ A1 \end{vmatrix}$ Expansion of expression	$\frac{4(2x-3y)+3(2x-3y)}{12}$ $\frac{3x-20y+6x-9y}{12}$ $\frac{14x-29y}{12}$ A1 Expansion of expressions	1	12 12 12 12 12 12 12 12		
$\begin{vmatrix} 12\\ = \frac{8x - 20y + 6x - 9y}{12} \\ = \frac{14x - 29y}{12} \\ A1 \end{vmatrix}$ Expansion of expression	$\frac{12}{8x - 20y + 6x - 9y}{12}$ $\frac{12}{12}$ $\frac{14x - 29y}{12}$ $A1$ Expansion of expressions		$=\frac{4(2x-5y)+5(2x-5y)}{12}$		
$\begin{vmatrix} =\frac{8x-20y+6x-9y}{12} \\ =\frac{14x-29y}{12} \end{vmatrix}$ MI Expansion of expression A1	$\frac{8x - 20y + 6x - 9y}{12}$ $\frac{14x - 29y}{12}$ A1 Expansion of expressions				
$=\frac{12}{14x - 29y}$ A1	$\frac{12}{14x - 29y}$		$=\frac{8x-20y+6x-9y}{2}$	MI	Expansion of expressions
$=\frac{14x-29y}{12}$ A1	$\frac{14x - 29y}{12}$ A1		12		
- <u>12</u>	12 AI		$-\frac{14x-29y}{2}$	A 1	5
			12	AI	
12	12		$=\frac{12}{8x - 20y + 6x - 9y}$ $=\frac{14x - 29y}{12}$	M1	Expansion of expressions

11a	5a(7x-y)	B1	
11b	2ax + 6bx - ay - 3by		
	=2x(a+3b)-y(a+3b)		
	=(2x-y)(a+3b)	M1	
		AI	
12a	$\angle BCA = 20^{\circ}$ (base $\angle s$ of isos, triangle)		
	(
	Exterior angle		
	$= 20^{\circ} + 20^{\circ} (\text{ext } \angle = \text{sum of int. opp. } \angle \text{s})$	M1	
121	$=40^{\circ}$	AI	
120	$= 180^\circ - 40^\circ$ (/s sum of triangle)	M1	
	$= 140^{\circ}$	1411	
	110		
	$\angle ACD = 140^{\circ} - 20^{\circ}$		
	= 120°	A1	
13	In 1 hour, fraction of the room painted		
	$=\frac{1}{2}+\frac{1}{2}$	M1	
	2 4	IVII	
	$=\frac{2}{4}+\frac{1}{4}$		
	4 4		
	$=\frac{5}{4}$		
	3		
	$\frac{3}{4}$ room painted in 1 hr		
	4 1		
	$\frac{1}{4}$ room painted in $\frac{1}{3} \times 4$ hrs	M1	
	4 5		
	$=1\frac{1}{3}$ hrs	Al	
14ai	Alfred's earnings = $S(x - 200)$	B 1	
14aii	Betty's earnings = $3x$	B 1	
14aiii	Sum of Betty, Nick and Alfred's earnings	2.54	
	=3x + x + (x - 200)	M1	
	= \$(5x - 200)	AI	
14b	Since the sum of all their earnings is \$8800,		
	5x - 200 = 8800	M1	
	5x = 9000		
	x = 1800		
	Hence, Nick's earnings is \$1800.	Al	

15a	9	B1	
15b	5 + 10 = (x - 1) + 4 + 1		
	15 = x + 4		
	<i>x</i> = 11	B1	
15c	$\frac{0 \times 5 + 1 \times 10 + 2 \times x + 3 \times 4 + 4 \times 1}{5 + 10 + x + 4 + 1} = 1.5$	M1	
	$\frac{2x+26}{x+20} = 1.5$		
	2x + 26 = 1.5(x + 20)		
	2x + 26 = 1.5x + 30		
	0.5x = 4		×
	<i>x</i> = 8	A1	
16a	9	B1	
16b	As shown in attached graph.	B1	Correct scale used on both
	<u>ه</u>		axes.
		B1	Correct plotting of points.
		B 1	Straight line passing through
			all points.
16c	-1.7	B1	Accept answers from -1.6 to
			-1.8

Marking Scheme for Math 1E SA2 P2 2017

Qn	Marking Point	Marks	Remarks
		Awalueu	
1	$\frac{(n-2) \times 180^{\circ}}{n} = 156^{\circ}$ $180n - 360 = 156n$ $180n - 156n = 360$ $24n = 360$ $n = \frac{360}{24}$	M1	
	n = 15	A1	
2(a)	$\frac{\left(-\frac{2}{3}\right)^3}{7.2386 - 2.3412} = -0.060500 \approx -0.0605$	B1	
2(b)	$\sqrt{2} + 3\sqrt{5} - 1.273 = 6.8494 \approx 6.85$	B 1	
3(a)	-8, -11	B1	
3(b)	Tn = 10 - 3n	B1	
3(c)	T53 = 10 - 3(53) = -149	B1	
4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	M1	
	Greatest possible number of hampers		
	$= 3 \times 11$	A1	
	= 33	AI	
-	Total union of inhome from Circutal		
5	$= 378 + 62.90 \times 24 = 1887.60	M1	
	Total price of iphone from Starhub	M1	
	$= 501 + 42.90 \times 24 = 1590.00 Starbub is more value for monev	A1	

We Nurture Students to Think, Care and Lead with P.R.I.D.E.

BP~334

6(0)	5 2		
0(a)	$\frac{5x}{2} > 1.2 + \frac{2x}{11}$	×	
	3 11 5		
	$\frac{3x}{2} - \frac{2x}{11} > 1.2$		
	3 11 55 x 6 x		
	$\frac{33x-6x}{22} > 1.2$	M1 or	
	33	3.41	
	20.6	IVII	
	$x > \frac{59.0}{40}$		
22	49		
	1 > 0.00010	A1	
6(b)	smallest prime number of $x=2$	B1	Must follow hence.
7(a)	Cashiers	 	
	$=\frac{168}{100} \times 4$	M1	
	= 48	A1	
7(b)	Managers in 2015		
	$=\frac{168}{3} \times 3$		
	3+4+7 = 36		
	Managers in $2014 = \frac{36}{2} \times 100 = 30$		
	$120 \times 100 = 50$	MI	
		AI	
8(a)	2(5x+13) = 3(x+1)+2		
0(4)	10r + 26 = 3r + 3 + 2	M1	
	7 = 21	Gâle / G	$= - \frac{1}{2} \left\{ \hat{\mathbf{u}}_{1}, \cdots, \hat{\mathbf{v}}_{n} \right\}$
	x = -21	$\int_{M} \int_{M} \int_{M$	이 아이는 것 같아요.
0(1)	x = -3	<u>A1</u>	
8(0)	$\left(\frac{4y}{5} - \frac{2y+1}{2}\right) = \frac{1}{7}$		
	3(4y) = 5(2y + 1) = 1		
	$\frac{J(+y) - J(2y+1)}{15} = \frac{1}{7}$	M1 (awarded	
	12y - 10y - 5 = 1	denominator	
	$\frac{12y-10y-3}{15} = \frac{1}{7}$	and	
υ.	2y = 5 + 1	numerator)	
	$\frac{-5}{15} = \frac{1}{7}$	· .	
	7(2y-5) = 15	M1 (awarded	
ik –	14y - 35 = 15	for correct	
	14 50	factorization)	
	14y = 50	Al	
	$y = \frac{50}{14}$	1	
21 - A.	14		

9(a)			
		unuur	
		B2	B1 for 2 correct
		52×	ordered pairs
		dam.	ordered punsi
	6 6 B		
		(Junio	
	╽╺╍┿╍╋╍╋┅┿╱╊╍╄╍┦╸╉╶┇╼╊╍╋╍╋╍╋╍╋╍╋╍╋╸╋╸╉╸		
		-	
		A.3.40	
		CPBL/	
		1 An-	
		enere.	
		1.7.4	
9(b)	Gradient		
	= -	M1	
	4 =2.25	A1	
0(0)	-2.25		
9(0)		MI	
	$=\frac{1}{2} \times 9 \times (8 + 14)$		
	$= 99 \text{ units}^2$	AI	
10()	000 0.01		
10(a)	800 m = 0.8 km	MI	
	l ime taken		
	$=\frac{0.6}{6}\times 60$		
	= 8 minutes	Al	
10(b)	Cycling Speed		
	2	M1	
	12÷60		
	= 10 km/n	Al	
10(c)	Average speed		
	0.8+2	M1	
	$-\frac{8}{60+60}$ $+\frac{10}{60}$ $+\frac{12}{60}$		
	= 5.6 km/h	A1	
11(2)	EAD - 1129 (company ding and AE northal	D1	
11(a)	$4EAB = 112^{\circ}$ (corresponding angle, AE parallel	DI	
	10 BC)		
11(b)	$4ABE = 180^{\circ} - 112^{\circ} - 42^{\circ} = 26^{\circ}$	IVII	
	(corresponding angle, AB parallel to ED)		
	$\angle BED = 26^{\circ}$	AI	
	(alternate angle, AB parallel to ED)		
11(e)			

	proved 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		
	E F H D H		
	Construct DH parallel to EF $4EDH = 180^{\circ} - 112^{\circ} = 68^{\circ}$ (interior angle, EF parallel to DH) $4HDC = 53^{\circ}$ (alternate angle, EF parallel to DH) Obtuse $4EDC = 53^{\circ} + 68^{\circ} = 121^{\circ}$ Reflex $4EDC = 360^{\circ} - 121^{\circ}$ $= 239^{\circ}$	M1 M1 A1	
	(angles at a point)		
12(a)	Cross Sectional Area		
	$= 8 \times 5 + \frac{1}{2} \times \pi \times 4^2$	M1	
	=65.132 $\approx 65.1 \text{ cm}^2$	A1	
12(bi)	Volume of original figure		
i and in a subscription of a	$= 65.132h \text{ cm}^3$	M1	$\ g\ _{L^{\infty}(\mathbb{R}^{n+1})}^{\infty}(\mathbb{R}^{n+1})(1-\mu)\ g\ _{L^{\infty}(\mathbb{R}^{n+1})}^{\infty}(1-\mu)\ g\ _{L^{\infty}(1-\mu)}^{\infty}(1-\mu)\ g\ _{L^{\infty}(1-\mu)}^{\infty}($
	Volume of cylinder = $\pi \times 1^2 \times h$ = $h \pi \text{ cm}^3$	M1	
	5(0 (5.122) 1 -		
	$500 = 05.132n - n\pi$		
	$560 = h(65.132 - \pi)$		
	$h = \frac{560}{1000}$		
	$65.132 - \pi$	4	
	$h = 9.03365 \approx 9.034cm$	A1	
12(bii)	Circumference of semicircle		
	$=\frac{1}{2} \times 2 \times \pi \times 4$		
	=12.566 cm		
	Perimeter of base = 12.566 + 5+ 8 +5 =30.566 cm		
	Original surface area = $30.566 \times 9.034 + 2 \times 65.132$ = 406.397 cm^2	M1	

Total surface area of artefact = 406.397 - $2 \times \pi \times 1^2 + 2 \times \pi \times 1 \times 9.034$ =456.87 $\approx 457 \text{ cm}^3$	M1 A1	