* MISSING P1

NAME: _____ ( ) CLASS: _____

FAIRFIELD METHODIST SCHOOL (SECONDARY)

END-OF-YEAR EXAMINATION 2014
SECONDARY 1 EXPRESS

MATHEMATICS

Paper 2

Date: 8 October 2014 **Duration: 1 hour 30 minutes**

Candidates answer on Question Paper.

Additional Material : Graph paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

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

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.
Calculators should be used 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.

At the end of the examination, fasten all your work securely together.
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.

At the end of the examination, fasten all your work securely together.

For Examiner's Use	
Paper 2	/ 60

Setter: Miss Germaine and Miss Lee CP

This question paper consists of 17 printed pages including the cover page.

Name: _____ ( ) Class: _____

Answer **all** the questions.

1 The original price of a box of chocolate is $13.80. During the Great Singapore Sale, there was a 20% discount. Calculate the sale price of the chocolate.

Answer $..... [2]

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2 At noon on a particular day, the temperature at the foot of a mountain was 12°C and the temperature at the peak of the mountain was −8 °C.

(a) Calculate the difference between the temperature at the peak of the mountain and the temperature at the foot of the mountain.

Answer (a) ..... °C [1]

(b) The height of the mountain is 3200 m. Given that the temperature changed with height at a constant rate, calculate the height from the foot of the mountain at which the temperature was 0°C.

Answer (b) ..... m [2]

Name: _____ ( ) Class: _____

3 In a certain month, German Bakery packs 480sausage buns, 720cheese rolls and 2460doughnuts to make as many sets of items as possible for distribution to needy families. Each set has the same number of sausage buns, cheese twists and doughnuts.

(a) Find the greatest number of sets of items that can be distributed.

Answer (a) ..... sets [2]

(b) How many doughnuts does each set of items have?

Answer (b) ..... doughnuts [1]

4 Factorise each of the following expressions completely.

(a) $6p^2q+9pq^2r+12pqr$

Answer (a) ..... [2]

(b) $cx-2cy-3dx+6dy$

Answer (b) ..... [2]

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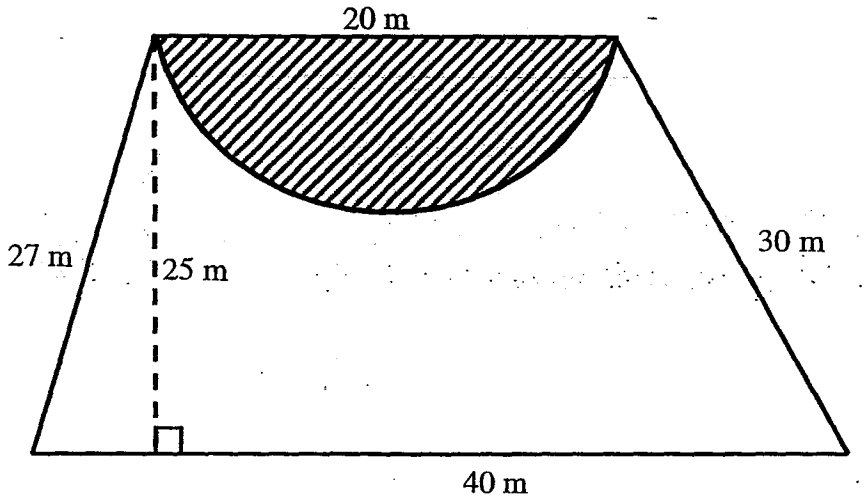
5 Express $\frac{y-3}{4}-\frac{y+5}{3}$ as a single fraction in its lowest term.

Answer ..... [3]

Name: _____ ( ) Class: _____

6 Mr Tan decides to have a garden planted in his backyard. His backyard is in the shape of a trapezium. His garden will occupy the area of the backyard except for the portion, a semi-circular piece (shaded part).



(a) Find the area of the garden he wishes to plant in his backyard. (Take π to be 3.142.)

Answer (a) .....m^2 [2]

(b) Find the perimeter of the garden.(Take π to be 3.142.)

Answer (b) ..... m [2]

Name: _____ ( ) Class: _____

7 In a class, there are 29 students. There are 7 more boys than girls. Let g be the number of girls.

(i) Form an expression in g to represent the number of boys.

Answer (i) ..... [1]

(ii) Form an equation in g and solve the equation.

Answer (ii) $g =$ ..... [2]

(iii) Hence, find the number of boys in the class.

Answer (iii) ..... boys [1]

8 A novice marathon runner started his training schedule with a total running distance of 4.1 km at 0825. He ran at an average speed of 8.5km/h for 1.7km before reaching a checkpoint. He stopped to rest for 20 minutes at the checkpoint. He continued running at an average speed of 9.6 km/h for the rest of the journey till he reached his final destination.

(a) Find the time at which he left the checkpoint to continue his run to his final destination.

Answer (a) ..... [2]

(b) Find the novice marathon runner's average speed, in m/min, of the whole journey.

Answer (b) .....m/min [2]

Name: _____ ( ) Class: _____

9 The following diagram shows the first three figures of a sequence of triangles.

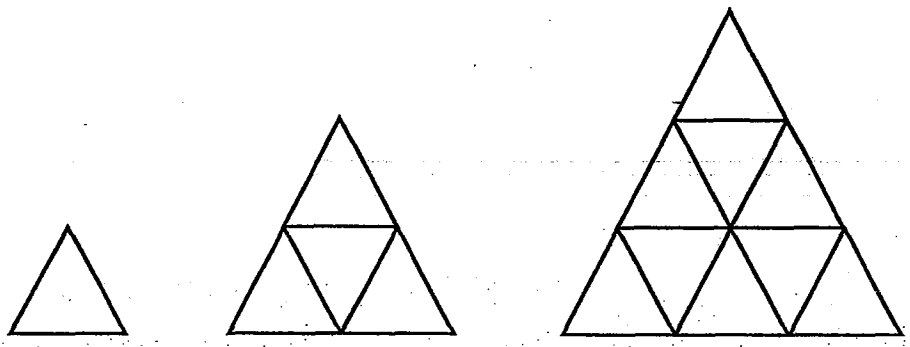


Figure 1
(1 Triangle)

Figure 2
(4 Triangles)

Figure 3
(9 Triangles)

(a) Draw Figure 4. [1]

Answer(a)

9

Figure	Number of triangles	Total
1	1	1
2	1 + 3	4
3	1+ 3 + 5	9
4		
5		x
:	:	:
:	:	:
n	$1 + 3 + 5 + \ldots +$ ____y____	z

(b) Complete the table above and thus find the value of x.

Answer (b) $x =$ ..... [1]

(c) Write an expression for y and z in terms of n, in its simplest form, for the nth term.

Answer (c) $y =$ .....

$z =$ ..... [2]

(d) Figure P is made up of 1089 triangles . Find the value of P.

Answer (d) P = ... [1]

Name: _____ ( ) Class: _____

10 The diagram shows a wooden object that John has carved for his Design and Technology project. It is a cube with a hollow circular core. The cube measures 8 m in length and the circular core has a diameter of 3m.

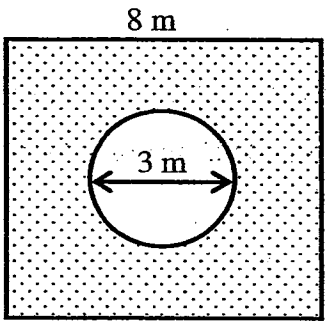


Figure 1

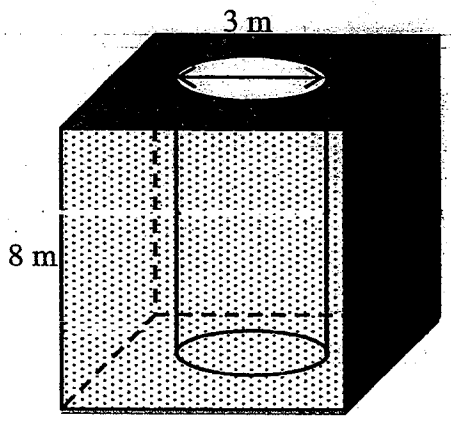


Figure 2

(a) Refer to Figure 1. Find the cross-sectional area of the object John has carved.

Answer (a) ..... m^2 [2]

(b) With reference to Figure 2, calculate the volume of the object.

Answer (b) ..... m^3 [2]

10 **(c)** Show that the curved surface area of the hollow circular core is 24π cm^2. [1]

Answer

(d) John intends to paint his wooden object. Find the total surface area of the wooden object that needs to be painted.

Answer (d) ..... m^2 [2]

Name: _____ ( ) Class: _____

11 Maria and her extended family of four decided to celebrate her daughter's 24th birthday at Prawn & Co. However, on their way home, she realised that the receipt was not printed properly and the end part of the receipt was blank. Thus she was unable to determine the total cost of the meal.

PRAWN& CO Tampines 1 10 Tampines Central , Singapore Tel : 6260 0183 GST Reg No : 1998 - 02488H	
1 Counter	2005 Pod 6
	Cover : 1
03 Aug 14 20: 42: 38	Tbl : 5 / 1
- Dine In -	
2 Seafood PL FOR 2 @83.90	83.90
1 Seafood Spaghetti	17.95
1 Prawn Fettuccini Chili CR	16.95
1 Black Coffee	3.00
4 Cold Water	0.00
1 ($2.50) Soup of the day	2.50
Subtotal	
G.S.T (7 %)	
Svc charge (10 %)	

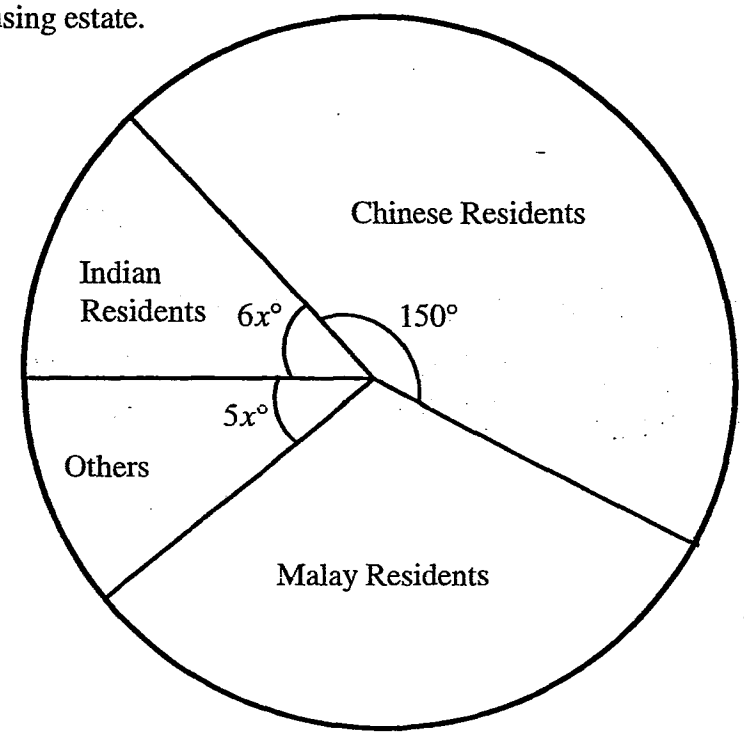
(a) Calculate the Service Charge to be paid by Maria.

Answer (a) $..... [1]

(b) Calculate the G.S.T to be paid by Maria.

Answer (b) $..... [2]

12 The following pie chart illustrates the racial distribution of the residents of a newly established housing estate.



(a) What percentage of the residents are Chinese?

Answer (a) ..... % [1]

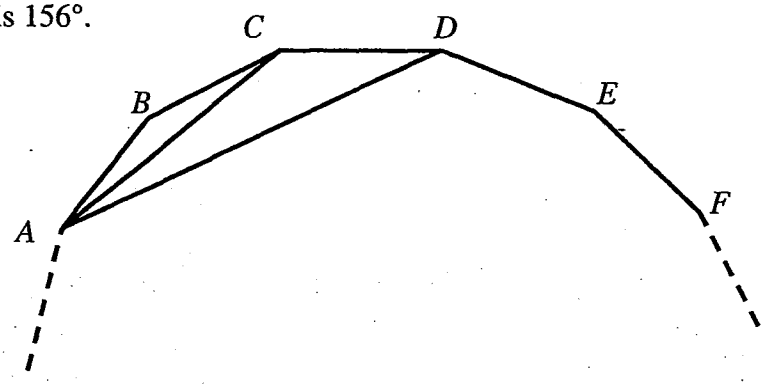
(b) **(i)** Given that there are 35 residents who are 'others', how many Indian residents are there in this housing estate?

Answer (b)(i) ..... Indian residents [2]

12 (b) (ii) Given that there are twice as many Malay residents as there are 'others', how many non-Chinese residents are there in the entire estate?

Answer (b)(ii) ..... non- Chinese residents [1]

13 The diagram shows part of a regular polygon with n sides. Each interior angle of this polygon is 156°.



Find

(a) the value of n,

Answer (a) $n =$ ..... [1]

(b) $\angle ACD$,

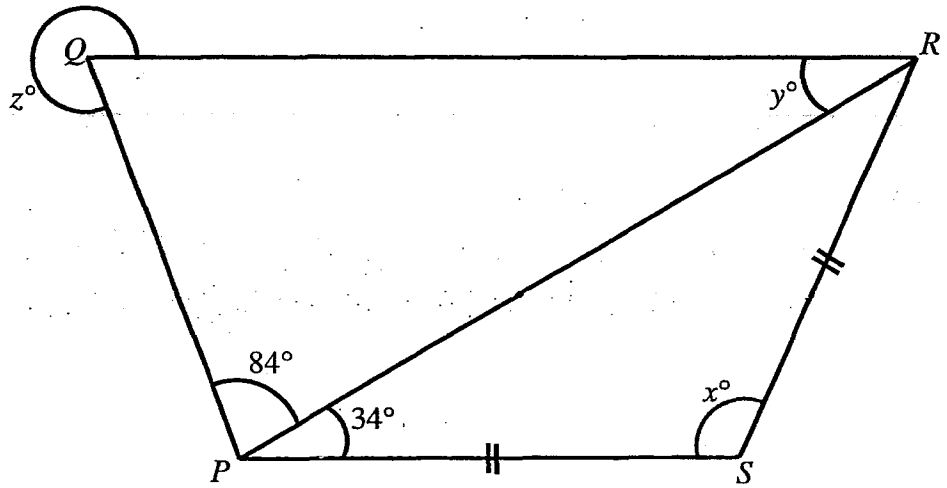
Answer (b) $\angle ACD =$ .....° [2]

(c) $\angle ADC$.

Answer (c) $\angle ADC =$ .....° [1]

Name: _____ ( ) Class: _____

14 In a trapezium, $PQRS$, PS is parallel to QR. $PS = SR$, angle $SPR = 34°$ and angle$RPQ = 84°$.



Find

(a) x,

Answer (a) $x =$..... [1]

(b) y,

Answer (b) $y =$..... [1]

(c) z.

Answer (c) $z =$..... [2]

Name: _____ ( ) Class: _____

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

The variables x and y are connected by the equation $2y = x + 4$. Some corresponding values of x and y are given in the table below.

x	-5	-1	0	- 1	3
y	-0.5	1.5	p	2.5	3.5

(a) Calculate the value of p. [1]

(b) Using a scale of 2 cm to represent 1 unit on each axis, draw a horizontal x-axis for $-5 \leq x \leq 3$. [3]

On your axes, plot the points given in the table and join them with a smooth straight line.

(c) Use your graph to find

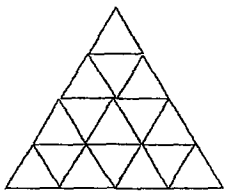
(i) the value of x when $y = 1$, [1]

(ii) the value of y when $x = 2$. [1]

~ End of Paper ~

Fairfield Methodist School (Secondary)
Secondary 1 Express
Mathematics
Paper 2
End-of-Year Examination 2014

No	Working	MarksAllocation
1	100% ---------- \$13.80 80% ---------- $\frac{13.80}{100}\times 80$ = \$11.04 (2 d.p.)	M1 – Mark awarded for correct correlation A1
2(a)	$12-(-8)=20°C$	B1 – Mark awarded for change of sign and answer
2(b)	$3200\div 20=160$ $160\times 12=1920m$	M1 A1
3(a)	Finding H.C.F of 480, 720, 2460. 10 | 480 , 720 , 2460 6 | 48, 72, 246 8, 12, 41 No. of sets = $10\times 6=60$	B1 - Mark awarded for H.C.F working and answer A1
3(b)	$480\div 60=8$ $720\div 600=12$ $2460\div 600=41$ No. of doughnuts: 41	A1
4(a)	$6p^2q+9pq^2r+12pqr$ $=3pq(2p)+3pq(3qr)+3pq(4r)$ $=3pq(2p+3qr+4r)$	M1 - Mark awarded for collecting and removing common factor A1
4(b)	$cx-3dx-2cy+6dy$ $=x(c-3d)-2y(c-3d)$ $=(x-2y)(c-3d)$	M1 - Mark awarded for identifying and removing common factor A1
5	$\frac{y-3}{4}-\frac{y+5}{3}$ $=\frac{3(y-3)}{12}-\frac{4(y+5)}{12}$ $=\frac{3y-9-4y-20}{12}$ $=\frac{-y-29}{12}$	M1 – Mark awarded for changing to common denominator M1 – Mark awarded for change of sign in 2nd bracket and simplification A1

No	Working	MarksAllocation
6(a)	Area of garden = Area of trapezium – Area of semi –circle $=\frac{1}{2}(20+40)(25)-\frac{1}{2}(10^2)(3.142)$ $=750-157.1$ = 592.9 = 593 m^2 (3 s.f.)	M1 – Mark awarded for correct formula used and correct numbers substituted for trapezium A1
6(b)	Perimeter of garden $=\frac{1}{2}$ circumference of semi - circle + 30 + 40 + 27 $=\frac{1}{2}(20)(3.142)+97$ $=128.42$ = 128 m (3 s.f.)	M1 – Mark awarded for identifying half the diameter of circle and correct identification of other edges to be added A1
7(i)	Number of boys = $g+7$	A1
7(ii)	$g+g+7=29$ $2g+7=29$ $2g=22$ $\therefore g=11$	M1 – Mark awarded for correct formation of equation and correct simplification A1
7(iii)	Number of boys $=g+7$ $=11+7=18$	A1
8(a)	$8.5km-1hr$ $1.7km-\frac{1}{5}hr=12\min$ $\therefore$ 08 25 + 12 mins + 20 mins = 08 57 or 8 57 am	M1 – Mark awarded for correct correlation A1
8(b)	Time taken for second part of the journey $=\frac{4.1-1.7}{9.6}$ $=\frac{1}{4}$h Average speed for whole journey $=\frac{4.1}{12+20+15}$ $=\frac{4100}{47}$ $=87\frac{11}{47}$ Or $=87.2$ m/min(3s.f.)	M1 – Mark awarded for use of total distance over total time A1
9(a)		B1
9(b)	x = 25 triangles	B1

<table>
<tr><th>No</th><th>Working</th><th>MarksAllocation</th></tr>
<tr><td>9(b)</td><td>
<table>
<tr><th>Figure</th><th>Number of △</th><th>Total</th></tr>
<tr><td>1</td><td>1</td><td>1</td></tr>
<tr><td>2</td><td>1 + 3</td><td>4</td></tr>
<tr><td>3</td><td>1+ 3 + 5</td><td>9</td></tr>
<tr><td>4</td><td>1 + 3 + 5 + 7</td><td>16</td></tr>
<tr><td>5</td><td>1 + 3 + 5 + 7 + 9</td><td>25</td></tr>
<tr><td>:</td><td>:</td><td>:</td></tr>
<tr><td>:</td><td>:</td><td>:</td></tr>
<tr><td>n</td><td>1 + 3 + 5 + ... + y</td><td>z</td></tr>
</table>
</td><td>B1 – Mark awarded when n^2 derived</td></tr>
<tr><td>9(c)</td><td>$y = 2n - 1$
$z = n^2$</td><td>B1

B1</td></tr>
<tr><td>9(d)</td><td>$P^2 = 1089$
$\therefore P = \sqrt{1089} = 33$</td><td>
A1</td></tr>
<tr><td>10(a)</td><td>Area of the cross section
$= 8^2 - \pi(1.5^2)$
$= 56.9314$
$= 56.9\ m^2$(3s.f.) or 56.9 m^2 (if $\pi = 3.142$ is used.)</td><td>M1 – Mark awarded for correct substitution of numbers into formula
A1</td></tr>
<tr><td>10(b)</td><td>
<table>
<tr><td><u>Method 1</u>
Volume of the wooden receptacle
= Volume of cube – Volume of hollow core
$= 8^3 - \pi(1.5^2)(8)$
$= 455.4513$</td><td><u>Method 2</u>
Volume of the wooden receptacle
= Cross-sectional area x Ht
= 56.9314 x 8
= 455.45</td></tr>
<tr><td>$= 455\ m^3$ (3 s.f.) or 455 m^3 (if $\pi = 3.142$ is used.)</td><td>$= 455\ m^3$ (3 s.f.) or 455 m^3 (if $\pi = 3.142$ is used.)</td></tr>
</table>
</td><td>M1 –Mark awarded for correct identification of formulas to be used and for correct substitution of values

A1</td></tr>
<tr><td>10(c)</td><td>Curved surface area of cylinder
$= 2\pi(1.5)(8)$
$= 24\pi$</td><td>

A1</td></tr>
<tr><td>10(d)</td><td>Surface area of receptacle to be painted
= Area of 4 squares + 2 cross-sectional areas + curved surface area of hollow core
$= 4(8^2) + 2(56.9314) + 2\pi(1.5)(8)$
$= 256 + 113.8628 + 24\pi$
$= 445.261$
$= 445\ m^2$ (3 s.f.)or445 m^2 (if $\pi = 3.142$ is used.)</td><td>M1 – Mark awarded for correct identification of formulas to be usedand for correct substitution of values

A1</td></tr>
</table>

No	Working	MarksAllocation
11(a)	Sub Total: $124.30 Service Charge: $\frac{10}{100}\times 124.30$ = $12.43	A1 – Mark awarded for correct subtotal and correct svc. charge tabulated
11(b)	GST: $\frac{7}{100}(12.43+124.30)$ $=\frac{7}{100}(136.73)$ $=\$9.5711$ $=\$9.57$ (2 d.p.)	M1 – Mark awarded for identification of new sub total A1 *Mark not awarded if answer not correct to 2 d.p.
12(a)	$\frac{150}{360}\times 100 = 41\frac{2}{3}$ or 41.7 (3 s.f.) %	M1- Mark awarded for correct calculation and answer
12(bi)	$\frac{35}{5}\times 6 = 42$ Indian residents	M1 - Mark awarded for working A1
12(bii)	Number of non-Chinese residents $=42+35+70$ $=147$	A1
13(a)	Exterior angle = $180°-156°=24°$ (angles on a straight line) Number of sides, n = $\frac{360}{24}=15$	B1
13(b)	$\angle BCD=\frac{180°-156°}{2}=12°$ (angles in an isosceles triangle) $\angle ACD=156°-12°=144°$	M1 A1
13(c)	$\angle ADC=180°-156°=24°$ (interior angles, parallel lines)	B1
14(a)	x = 180 – 34 – 34 = 112 (angle sum of a triangle)	B1
14(b)	y = 32 (Alternate angles)	B1
14(c)	W = 180 – 84 – 34 = 62 (angles sum of triangle), where w + z = 360 Z = 360 – 62 = 298 (angles at a point)	M1 A1
15(a)	p = 2	B1
15(b)	Refer to Graph	Points and draw a line[P2] Scale and label [B1] If any error, minus 1 mark
15(c)(i)	$x = -2$	B1
15(c)(ii)	$y = 3$	B1