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FAIRFIELD METHODIST SCHOOL (SECONDARY)

END-OF-YEAR EXAMINATION 2015 SECONDARY 1 EXPRESS

MATHEMATICS

Paper 1

Date: 7 October 2015

Duration: 1 hour 30 minutes

Candidates answer on the Question Paper.

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 tape/fluid.

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 .

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.

For Examiner's Use	
Paper 1	/ 60
Paper 2	/ 60
Total	%

Setters: Miss Lee CP

This question paper consists of 14 printed pages including the cover page.

Name: _____ ()

Class: _____

Answer **all** the questions.

- 1 State which of the following numbers are irrational.

$$\sqrt{2} \times \sqrt{8}, \quad \frac{22}{7}, \quad \pi, \quad 3\sqrt{5}, \quad 2.\dot{6}$$

Answer [1]

- 2 Consider the following numbers.

$$942\frac{1}{3}\%, \quad 3\pi, \quad \frac{471}{50}, \quad 9.\dot{4}\dot{3}$$

Arrange the numbers in descending order.

Answer [1]

- 3 (a) The area of a circle is 108π square centimetres. Find the length of radius of the circle correct to the nearest centimetre.

Answer (a)cm [1]

- (b) Round off 198.45 to 2 significant figures.

Answer (b) [1]

Name: _____ () Class: _____

- 4 Estimate, without the use of a calculator, $\frac{20.14 \times (2.04)^3}{\sqrt{2512}}$ correct to 1 significant figure.

Answer [2]

- 5 (a) Express $\frac{3}{20}\%$ as a decimal number.

Answer (a) [1]

- (b) A man bought a television set at a price of \$1440 after a 20% discount during a sale. Find the marked price of the television set.

Answer (b) \$..... [1]

Name: _____ () Class: _____

6 Solve $9x - (2x - 6) = 8 - x$.

Answer $x =$ [2]

- 7 (a) The n th term of a sequence is given by $2n^2 + 2$.
Write down the first 4 terms.

Answer (a) , , , [1]

- (b) The first 4 terms of another sequence are 2, 8, 18, 32, ...

- (i) Write down the next term.

Answer (b)(i) [1]

- (ii) By comparing this sequence with your answer to (a), write down the n th term.

Answer (b)(ii) [1]

Name: _____ ()

Class: _____

- 8 Showing your working clearly, without the use of a calculator, evaluate

$$-\frac{7}{3} \div \left[\left(-\frac{1}{5} - \frac{2}{3} \right) \times 15 \right] - \left(-\frac{1}{4} \right).$$

Answer [2]

-
- 9 Given that $\frac{a}{b} = \sqrt{\frac{b^2 - 2c}{2}}$, find the value of c when $a = -1$ and $b = 2$.

Answer $c =$ [2]

Name: _____ () Class: _____

10 Petrol costs w cents per litre.

- (i) Find an expression, in terms of w , for the number of litres of petrol that can be bought with 1 cent.

Answer (i)l [1]

- (ii) Find an expression, in terms of w and x , for the number of litres of petrol that can be bought with x dollars.

Answer (ii)l [1]

- 11** If the interior angles of a hexagon are in the ratio $2 : 3 : 3 : 4 : 4 : 4$, find the largest exterior angle.

Answer ° [3]

- 12 (a) Factorise completely $y(x + 2) + 3(x + 2)$.

Answer (a) [1]

- (b) Expand and simplify $3(x - 2y) - 2[(3x - y) - 2x]$.

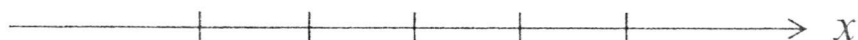
Answer (b) [2]

- 13 (a) Solve the inequality $x - 8 < 29 - 3x$.

Answer (a) [2]

- (b) Express the solution in (a) on a number line.

Answer (b) [1]



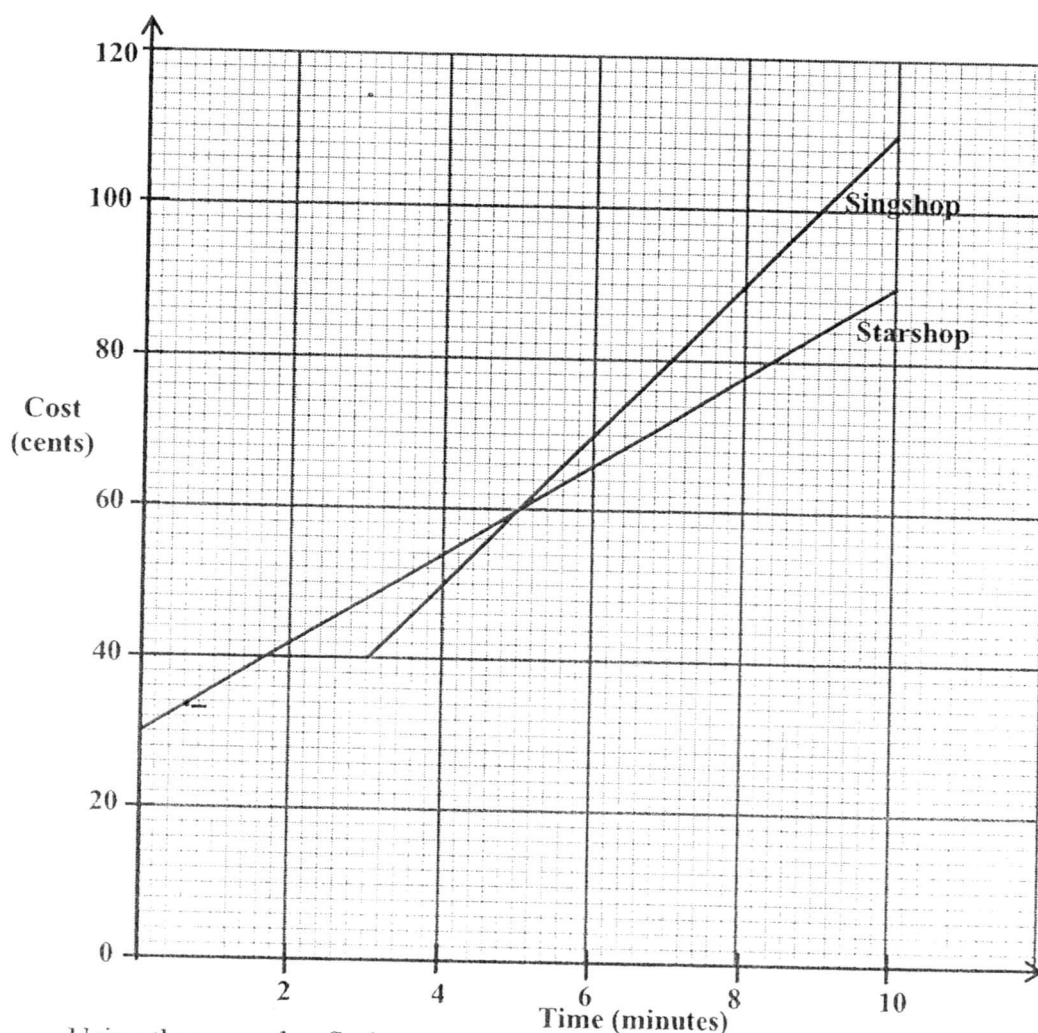
- (c) Find the largest prime number which satisfies the inequality.

Answer (c) [1]

- 14 The graph shows the charges made by two companies for telephone calls lasting up to 10 minutes.

Singshop charges 40 cents for calls for the first 3 minutes and 10 cents per minute for each subsequent minute.

Starshop charges a connection fee of p cents and all calls are charged at a constant rate of q cents per minute.



Using these graphs, find

- (a) the cost of a 7-minute call made using Singshop,

Answer (a) \$ [1]

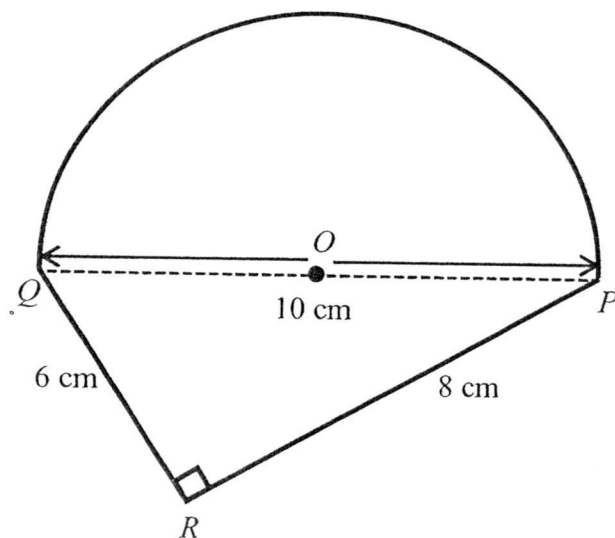
- (b) the value of p ,

Answer (b) p = [1]

- (c) the value of q .

Answer (c) q = [1]

- 15 The figure is made up of a right-angled triangle PQR and a semicircle. POQ is the diameter of the semicircle with centre O .



Given that $PR = 8$ cm, $QR = 6$ cm and $PQ = 10$ cm, find

- (a) the perimeter of the figure, leaving your answer in the form $(a + b\pi)$ cm,

Answer (a) cm [2]

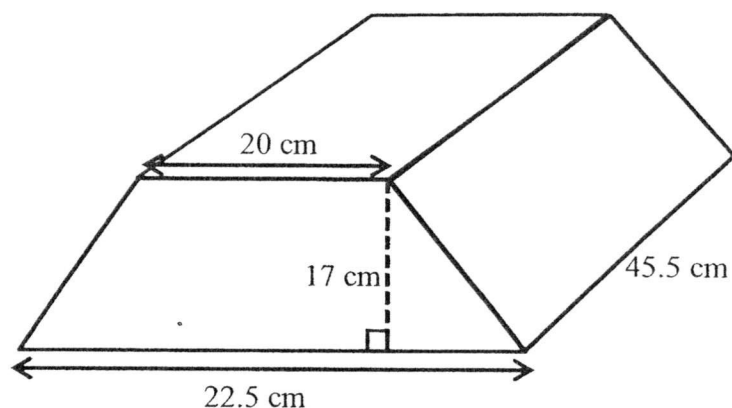
- (b) the area of the figure.

Answer (b) cm^2 [2]

Name: _____ ()

Class: _____

- 16 The figure shows a sketch of the world's largest gold bar that is 45.5 cm long. It is a solid prism with uniform cross section of a trapezium.



- (a) Find the volume of the gold bar.

Answer (a) cm^3 [2]

- (b) The gold bar is melted and made into rectangular gold metal sheets of dimension 297 mm by 210 mm. Each sheet has a thickness of 2 mm. Find the maximum number of gold metal sheets that can be made using the gold bar.

Answer (b) gold sheets [2]

Name: _____ () Class: _____

17 Mrs Tan sponsored a total of 96 hot dogs, 72 packets of fruit juice and 48 cake slices for a class picnic.

- (a) Given that each student will receive the same amount of each item, find the maximum number of students that can attend the class picnic.

Answer (a)students [2]

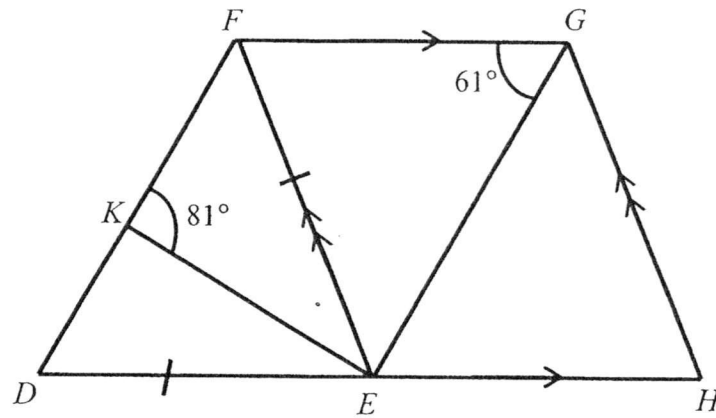
- (b) How many hot dogs, packets of fruit juice and cake slices will each student receive?

Answer (b) hot dogs , packet fruit juice, cake slices [1]

Name: _____ ()

Class: _____

- 18 In the diagram, $\triangle DEF$ is an isosceles triangle and $EFGH$ is a rhombus. It is given that $\angle FGE = 61^\circ$, $\angle FKE = 81^\circ$, $DE = FE$ and both DEH and DKF are straight lines.



By stating your reasons clearly, calculate

- (a) $\angle EHG$,

Answer (a) $\angle EHG = \dots\dots\dots^\circ$ [2]

- (b) reflex $\angle FGH$,

Answer (b) reflex $\angle FGH = \dots\dots\dots^\circ$ [1]

- (c) $\angle KFG$,

Answer (c) $\angle KFG = \dots\dots\dots^\circ$ [2]

- (d) $\angle DEK$.

Answer (d) $\angle DEK = \dots\dots\dots^\circ$ [1]

- 19 (a) (i) Express 180 as the product of its prime factors.

Answer (a)(i) [1]

- (ii) The lowest common multiple of 12, 15, x is 180. Find the two possible values of x which are odd numbers and are greater than 1.

Answer (a)(ii) $x =$, [1]

- (b) The numbers 2520 and 3375, written as the products of their prime factors, are

$$2520 = 2^3 \times 3^2 \times 5 \times 7, \quad 3375 = 3^3 \times 5^3$$

Find

- (i) $\sqrt[3]{3375}$,

Answer (b)(i) [1]

- (ii) the smallest positive integer value of n for which $2520n$ is a multiple of 3375,

Answer (b)(ii) $n =$ [1]

- (iii) the smallest positive integer k such that $\frac{2520}{k}$ is a perfect square.

Answer (b)(iii) $k =$ [1]

- 20 (a) Using ruler, set square, protractor and compasses only, construct
- (i) a trapezium $PQRS$ such that PQ is parallel to SR , $PQ = 9.4$ cm, $QR = 5.2$ cm, $RS = 3.8$ cm and $\angle PQR = 80^\circ$, [2]
 - (ii) the angle bisector of $\angle PQR$ such that it cuts PS at point T , [1]
 - (iii) the perpendicular bisector of QR such that it cuts PS at point U . [1]

Answer for (a)(i), (a)(ii), (a)(iii)



- (b) Measure and write down the length of TQ .

Answer (b) $TQ =$ cm [1]

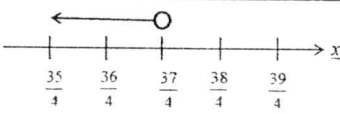
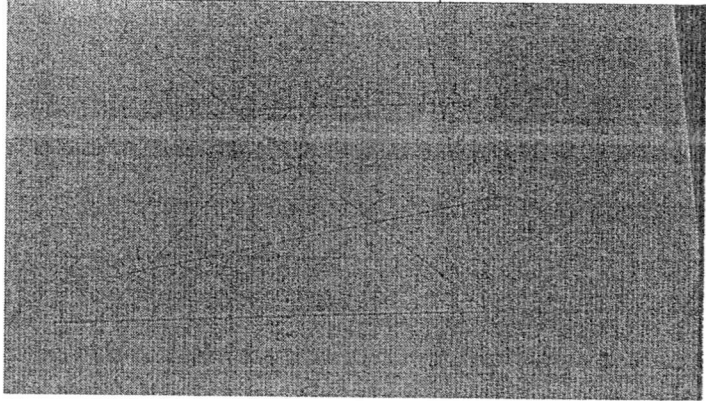
- (c) Measure the smallest interior angle of trapezium $PQRS$.

Answer (c) $^\circ$ [1]

- End of Paper -

End of Year Examination
Secondary 1 Express Mathematics Paper 1

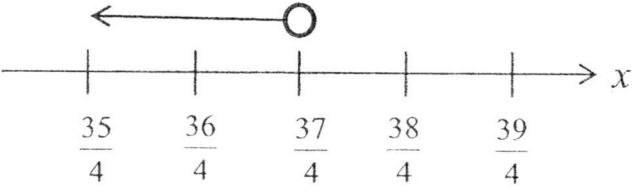
Answer Key

1	$\pi, 3\sqrt{5}$	2	$9.\dot{4}\dot{3}, 3\pi, 942\frac{1}{3}\%, \frac{471}{50}$	3(a)	10 cm
3(b)	200	4	3.2	5(a)	0.0015
5(b)	\$1800	6	$x = \frac{1}{4}$ or 0.25	7(a)	4, 10, 20, 34
7(b)(i)	50	7(b)(ii)	$2n^2$	8	$\frac{67}{156}$
9	$c = \frac{7}{4}$ or 1.75	10(i)	$\frac{1}{w}$	10(ii)	$\frac{100x}{w}$
11	108°	12(a)	$(x+2)(y+3)$	12(b)	$x-4y$
13(a)	$x < \frac{37}{4}$ or $x < 9\frac{1}{4}$	13(b)		13(c)	7
14(a)	\$0.80	14(b)	30	14(c)	6
15(a)	$(5\pi + 14)$ cm	15(b)	63.7 cm^2 (3 s.f.)	16(a)	16436.875 cm^3 or 16400 cm^3 (3 s.f.)
16(b)	131 gold sheets	17(a)	24	17(b)	4 hot dogs, 3 can fruit juice and 2 slices of cakes
18(a)	58°	18(b)	238°	18(c)	119°
18(d)	20°	19(a)(i)	$180 = 2^2 \times 3^2 \times 5$	19(a)(ii)	9, 45
19(b)(i)	15	19(b)(ii)	75	19(a)(iii)	70
20(a)					
20(b)	$TQ = 6.9 \pm 0.1 \text{ cm}$	20(c)	$48 \pm 1^\circ$		

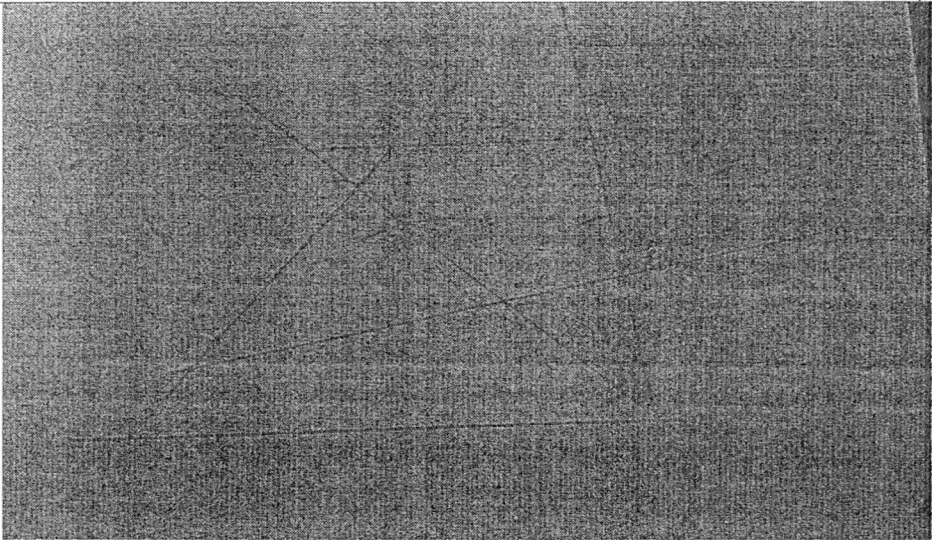
Fairfield Methodist School (Secondary)
Secondary 1 Express
Paper 1
Mathematics
End-of-Year Examination 2015

No	Working	Description	Marks Allocation
1	$\pi, 3\sqrt{5}$		B1
2	$942\frac{1}{3}\% = 9.42333\dots$ $3\pi = 9.424777961$ $\frac{471}{50} = 9.42$ $9.\dot{4}\dot{3} = 9.43434343\dots$ Descending order: $9.\dot{4}\dot{3}, 3\pi, 942\frac{1}{3}\%, \frac{471}{50}$		B1
3(a)	Radius of circle, $r = \sqrt{108\pi \div \pi} = 10.39230\dots$ $= 10 \text{ cm}$		B1
3(b)	200		B1
4	$\frac{20.14 \times (2.04)^3}{\sqrt{2512}}$ $= \frac{20 \times 2^3}{\sqrt{2500}}$ $= \frac{20 \times 8}{50}$ $= 3.2 = 3$	No working but correct answer, award A1	M1 A1
5(a)	$\frac{3}{20}\% = 0.0015$		B1
5(b)	Sale price = \$1440 Marked price = $\$1440 \times \frac{100}{80} = \1800 Or 80% ----- \$1440 100% ----- $\frac{\$1440}{80} \times 100 = \1800		B1
6	$9x - (2x - 6) = 8 - x$ $9x - 2x + 6 = 8 - x$ $7x + x = 8 - 6$ $8x = 2$ $x = \frac{1}{4} \text{ or } 0.25$	Expansion of bracket; must be correct for both terms	M1 A1
7(a)	4, 10, 20, 34	All correct	B1
7(b)(i)	50		B1
7(b)(ii)	$2n^2$		B1

No	Working	Description	Marks Allocation
8	$-\frac{7}{3} \div \left[\left(-\frac{1}{5} - \frac{2}{3} \right) \times 15 \right] - \left(-\frac{1}{4} \right)$ $= -\frac{7}{3} \div \left[\left(\frac{-3-10}{15} \right) \times 15 \right] + \frac{1}{4}$ $= -\frac{7}{3} \div [(-13)] + \frac{1}{4}$ $= \frac{7}{3} \times \frac{1}{13} + \frac{1}{4}$ $= \frac{7}{39} + \frac{1}{4}$ $= \frac{67}{156}$	[Convert division to multiplication and reciprocate fraction OR simplify inner bracket correctly]	M1 A1
9	Given that $\frac{a}{b} = \sqrt{\frac{b^2 - 2c}{2}}$, find the value of c when $a = -1$ and $b = 2$. $\frac{-1}{2} = \sqrt{\frac{2^2 - 2c}{2}} \quad \frac{-1}{2} = \sqrt{\frac{2^2 - 2c}{2}} \quad \frac{-1}{2} = \sqrt{\frac{2^2 - 2c}{2}}$ $-\frac{1}{2} = \sqrt{\frac{4 - 2c}{2}} \quad -\frac{1}{2} = \sqrt{\frac{4 - 2c}{2}} \quad -\frac{1}{2} = \sqrt{\frac{4 - 2c}{2}}$ $-\frac{1}{2} = \sqrt{2 - c} \quad \frac{1}{4} = \frac{4 - 2c}{2} \quad \frac{1}{4} = \frac{4 - 2c}{2}$ $\frac{1}{4} = 2 - c \quad \text{Or} \quad 2 = 4(4 - 2c) \quad \text{Or} \quad 1 = 2(4 - 2c)$ $2 - c = \frac{1}{4} \quad 2 = 16 - 8c \quad 1 = 8 - 4c$ $-c = \frac{1}{4} - 2 \quad 8c = 14 \quad 4c = 7$ $c = \frac{7}{4} \text{ or } 1.75 \quad c = \frac{14}{8} = \frac{7}{4} \text{ or } 1.75 \quad c = \frac{7}{4} \text{ or } 1.75$	Remove square root	M1 A1
10 (i)	w cents buys 1 litres 1 cent buys $\frac{1}{w}$ litres		B1
10(ii)	100 cents buys $\frac{100}{w}$ litres 1 dollars buys $\frac{100}{w}$ litres x dollars buys $\frac{100x}{w}$ litres		B1

No	Working	Description	Marks Allocation
11	Ratio of interior angle: 2: 3: 3: 4: 4: 4 20 units represent $(6-2) \times 180^\circ = 720^\circ$ 1 unit represent 36° Largest exterior angle = $180^\circ - 2(36^\circ) = 108^\circ$		M1 M1 A1
12(a)	$y(x+2) + 3(x+2)$ $= (x+2)(y+3)$		B1
12(b)	$3(x-2y) - 2[(3x-y) - 2x]$ $= 3x - 6y - 2[3x - y - 2x]$ $= 3x - 6y - 2[x - y]$ $= 3x - 6y - 2x + 2y \leftarrow$ $= x - 4y$	Expand the brackets correctly for 2 nd bracket	M1 A1
13(a)	$x - 8 < 29 - 3x$ $x + 3x < 29 + 8$ $4x < 37$ $x < \frac{37}{4}$ or $x < 9\frac{1}{4}$	Collecting the like terms correctly	M1 A1
13(b)			B1
13©	7	FT1 (if reasonable)	B1
14(a)	\$0.80		B1
14(b)	30		B1
14©	6		B
15(a)	Perimeter = Arc PQ + PR + RQ $= \frac{1}{2}\pi(10) + 6 + 8$ $= (5\pi + 14) \text{ cm}$	Method for arc PQ	M1 A1
15(b)	Area = Area of semicircle + Area of triangle $= \frac{1}{2}\pi(5)^2 + \frac{1}{2}(8 \times 6)$ $= 63.269$ $= 63.3 \text{ cm}^2$ (3 s.f.) If answer left in terms of $\frac{25}{2}\pi + 24 \text{ cm}^2$, accept answer.	Mtd for area of semicircle If answer not rounded off to 3 s.f. correctly, no marks	M1 A1

No	Working	Description	Marks Allocation
16(a)	Volume of prism/figure = Area of trapezium $\times$ height/length $= [\frac{1}{2}(20 + 22.5) \times 17] \times 45.5$ $= 16436.875$ or 16400 cm^3 (3 s.f.)	Formula for trapezium	M1 A1
16(b)	Volume on 1 metal sheet = $297 \text{ mm} \times 210 \text{ mm} \times 2 \text{ mm}$ $= 29.7 \text{ cm} \times 21 \text{ cm} \times 0.2 \text{ cm}$ $= 124.74 \text{ cm}^3$ No. of gold sheets = Volume of figure $\div$ Volume of 1 metal sheet $= 16436.875 \div 124.74$ $= 131.769$ $= 131$ sheets	If work out volume of 1 metal sheet or show division of Vol. of prism by volume of 1 metal sheet give method marks	M1 A1
17(a)	$ \begin{array}{r rrr} 3 & 96 & 72 & 48 \\ 8 & 32 & 24 & 16 \\ \hline & 4 & 3 & 2 \end{array} $ $\therefore$ Greatest no. of student = HCF of 96, 72 and 48 $= 3 \times 8$ $= 24$		M1 A1
17(b)	Each student received 4 hot dogs, 3 can fruit juice and 2 slices of cakes		B1
18(a)	$\angle EHG = 180^\circ - \angle HGE - \angle HEG$ (Angle sum of triangle and $\angle HEG = 61^\circ$, as Alt angle, $FG \parallel EH$) $\angle EHG = 180^\circ - 61^\circ - 61^\circ$ $= 58^\circ$		M1 A1
18(b)	Reflex $\angle FGH = 360^\circ - 61^\circ - 61^\circ$ (angles at a pt) $= 238^\circ$		B1
18(c)	$\angle FED = \angle GFE$ (Alt angles, $FG \parallel EH$) $= 58^\circ$ $\angle KFE = (180^\circ - 58^\circ) \div 2$ (Base angle of isos. Δ) $= 61^\circ$ $\angle KFG = 61^\circ + 58^\circ$ $= 119^\circ$	Find angle KFE	B1 B1
OR 18(c)	$\angle FED = \angle GFE$ (Alt angles, $FG \parallel EH$) $= 58^\circ$ $\angle FDE = (180^\circ - 58^\circ) \div 2 = 61^\circ$ (Base angle of isosceles triangle) $\angle KFG = 180^\circ - 61^\circ = 119^\circ$ (interior angles, $FG \parallel DE$)	Find angle FDE	B1 B1

No	Working	Description	Marks Allocation
18(d)	$\angle DEK = 81^\circ - 61^\circ = 20^\circ$ (Ext. angle of Δ) Or $\angle DEK = \angle FED - \angle FEK$ $= 58^\circ - 38^\circ = 20^\circ$		B1
19(a) (i)	$ \begin{array}{r l} 2 & 180 \\ 2 & 90 \\ 3 & 45 \\ 3 & 15 \\ 5 & 5 \\ \hline & 1 \end{array} $ $\therefore 180 = 2^2 \times 3^2 \times 5$		B1
19(a) (ii)	9, 45		B1
19(b) (i)	15		B1
19(b) (ii)	Smallest integer, $n = 75$		B1
19(b) (iii)	Smallest integer, $k = 70$		B1
20(a) (i)		B1 for parallel lines for trapezium B1 for trapezium B1 for (ii) B1 for (iii)	
20(a) (ii)			
20(a) (iii)			
20(b)	$TQ = 6.9 \pm 0.1$ cm		B1
20(c)	$48 \pm 1^\circ$		B1

NAME: _____ ()

CLASS: _____



FAIRFIELD METHODIST SCHOOL (SECONDARY)

END-OF-YEAR EXAMINATION 2015
SECONDARY 1 EXPRESS

MATHEMATICS

Paper 2

Date: 8 October 2015

Duration: 1 hour 30 minutes

Candidates answer on the Question Paper.

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.

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

If working is needed for any question it must be shown in the space below that question.

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 total number of marks for this paper is 60.

For Examiner's Use	
Paper 2	/ 60

Setter: Mr Kua KT

This question paper consists of 13 printed pages including the cover page.

Name: _____ ()

Class: _____

Answer **all** the questions.

- 1 La Paz, the capital city of Bolivia, is located at an altitude of 3640 m above sea level while Baku, the capital city of Azerbaijan, is located at an altitude of 28 m below sea level.

(a) Represent the altitude of Baku using a negative number.

Answer (a) [1]

(b) Hence, find the difference in altitude between La Paz and Baku.

Answer (b) m [1]

-
- 2 Suzy's monthly income consists of a basic salary of \$700 and a commission of 5.5% on her sales for the month. If Suzy's income is \$1690 for a particular month, find her sales for that month.

Answer \$ [3]

- 3 The rates of exchange between American dollars (US\$), Singapore dollars (S\$) and Korean won (₩) are $\text{US\$1} = \text{S\$1.2647}$ and $\text{S\$100} = \text{₩83917}$.

Convert the following into Singapore dollars, giving your answer correct to the nearest cent.

- (a) US\$365

Answer (a) S\$ [2]

- (b) ₩20 000

Answer (b) S\$ [2]

Name: _____ ()

Class: _____

- 4 The first three figures of a sequence are as shown below.



Figure 1



Figure 2

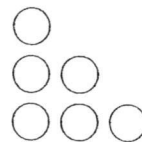


Figure 3

- (a) Draw Figure 4 of the sequence in the space below.

Answer (a)

Figure 4

[1]

- (b) Complete the table below.

Answer (b)

Figure Number, n	Number of Circles at Base of the Figure, n	Total Number of Circles, T_n
1	1	$1 = 1 = \frac{1 \times 2}{2}$
2	2	$1 + 2 = 3 = \frac{2 \times 3}{2}$
3	3	$1 + 2 + 3 = 6 = \frac{3 \times 4}{2}$
4		
$\vdots$	$\vdots$	$\vdots$
n		

[2]

- (c) Find the total number of circles in Figure 100.

Answer (c) circles [1]

- 5 A survey was conducted among 240 students to find out the mode of transport that they used to travel to school. The results of the survey are shown below.

Mode of Transport	Number of Students
By parent's car	70
By bus and/or MRT	100
By foot, i.e. walking	30
Others	40

- (a) The results of the survey are to be represented in the form of a pie chart. Complete the table below, showing your workings clearly.

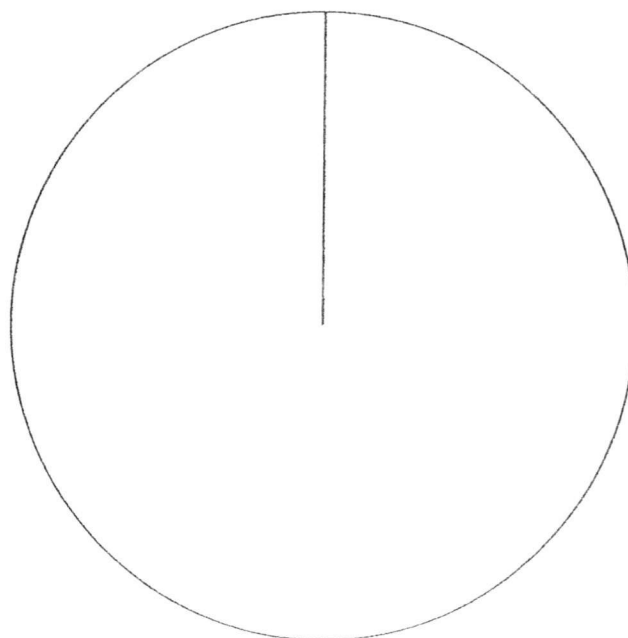
Answer (a)

Mode of Transport	Angle of Sector in a Pie Chart
By parent's car	
By bus and/or MRT	
By foot, i.e. walking	
Others	

[2]

- (b) Hence, represent the results of the survey in the pie chart below.

Answer (b)



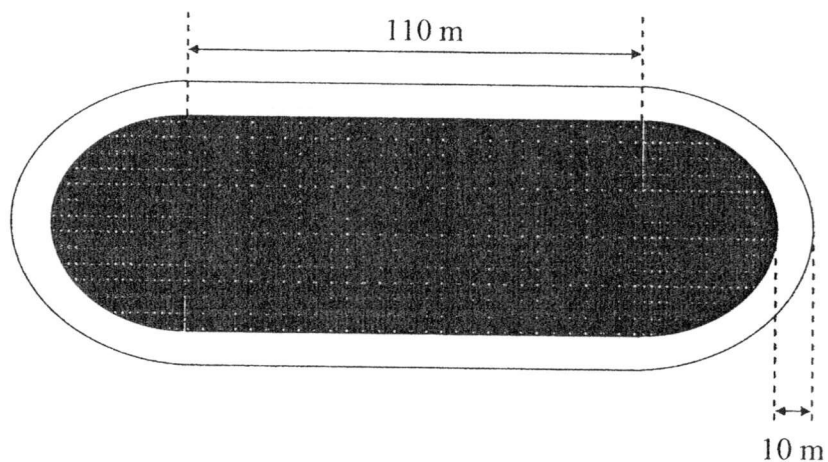
[2]

Mode of Transport

Name: _____ ()

Class: _____

- 6 The diagram below shows a rectangular football field with a semi-circular patch of recreational ground of radius 35 m at each end of the field. A running track with a uniform width of 10 m is built around the football field and the two semi-circular patches of recreational ground.



- (a) Find the perimeter of the shaded region. (Take π to be 3.142)

Answer (a) m [2]

Name: _____ ()

Class: _____

- 6 (b) Find the area of the running track. (Take π to be 3.142)

Answer (b) m² [3]

- 7 Smartphone price plans usually include a fixed monthly component and a variable component depending on the monthly usage. Two student price plans offered by a local telecommunication company are shown in the table below.

Student Price Plan	A	B
Monthly subscription	\$28	\$42
Contract duration	24 months	
Free local incoming calls	Unlimited	
Free local outgoing calls *	150 minutes	100 minutes
Free local data bundle #	1 GB	3 GB

* If outgoing calls exceed the free minutes provided, excess usage is charged at \$0.002/second.

If data usage exceeds free data bundle provided, excess usage is charged at \$10/GB and capped at \$30 monthly.

- (a) Jinny made 120 minutes of local outgoing calls and used 2 GB of local data in June 2015. Calculate her phone bill for the month of June 2015 if
- (i) she had signed up for Student Price Plan A,

Answer (a)(i) \$ [2]

- (ii) she had signed up for Student Price Plan B.

Answer (a)(ii) \$ [2]

- (b) Other than the monthly subscription fee, list 1 other factor Jinny should consider when deciding which plan to sign up for.

Answer (b)

..... [1]

8 Express each of the following as a fraction in its simplest form.

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

Answer (a) [3]

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

Answer (b) [3]

Name: _____ ()

Class: _____

- 9 Luis has some two-dollar, five-dollar and ten-dollar notes in his wallet. The number of two-dollar notes is thrice the number of ten-dollar notes. There are 2 more five-dollar notes than ten-dollar notes in his wallet.

- (a) Given that Luis has x ten-dollar notes in his wallet, write down an expression, in terms of x , for the number of five-dollar notes he has in his wallet.

Answer (a) five-dollar notes [1]

- (b) Luis gave his sister, Lucy, 4 two-dollar notes for her daily allowance.
(i) Write down an expression, in terms of x , for the number of two-dollar notes Luis has in his wallet after giving Lucy her daily allowance.

Answer (b)(i) two-dollar notes [1]

Luis has \$44 left in his wallet after giving Lucy her daily allowance.

- (ii) Form an equation, in terms of x , to represent the above information, and show that it can be simplified to $21x + 2 = 44$.

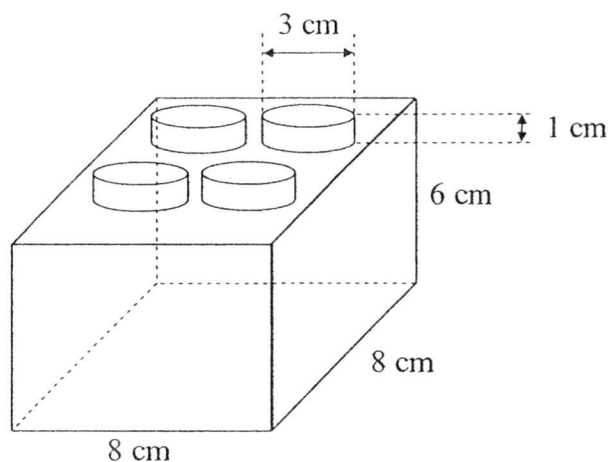
Answer (b)(ii)

[2]

- (c) Solve the equation in (b)(ii) to find the value of x .

Answer (c) $x =$ [2]

- 10 The diagram below shows a model of a Lego block. The model is made up of a cuboid measuring 8 cm by 8 cm by 6 cm, and 4 identical cylinders each with a base diameter of 3 cm and height of 1 cm.



- (a) Find the total volume of the model.

Answer (a) cm^3 [3]

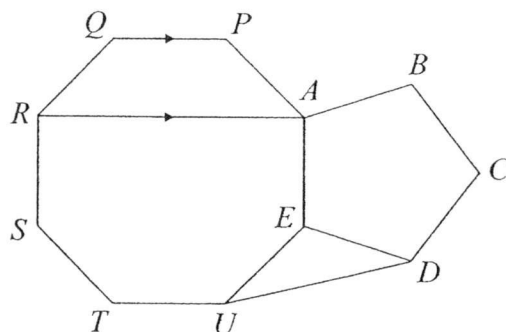
- (b) Find the total surface area of the model.

Answer (b) cm^2 [3]

Name: _____ ()

Class: _____

- 11 In the figure, $ABCDE$ is a regular pentagon and $APQRSTUE$ is a regular octagon. The two polygons share a common side AE , and QP is parallel to RA .



- (a) By stating your reason(s) clearly, find

(i) $\angle PQR$,

Answer (a)(i) $\angle PQR = \dots\dots\dots^\circ$ [2]

(ii) $\angle EDU$.

Answer (a)(ii) $\angle EDU = \dots\dots\dots^\circ$ [3]

- (b) Show that $\angle SRA$ is a right angle.

Answer (b)

[2]

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

The total fare for a taxi ride can be represented by the equation

$$y = 0.50x + 3.2$$

where y represents the total fare in dollars, and x represents the distance travelled by the taxi in kilometres.

The table below shows some values of x and y .

x	0	2	5	8
y	3.2	4.2	p	7.2

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

(b) Using a scale of 1 cm to represent 1 km, draw a horizontal x -axis for $0 \leq x \leq 8$.

Using a scale of 2 cm to represent \$1, draw a vertical y -axis for $0 \leq y \leq 8$.

Plot the pairs of values in the table above and draw the graph of $y = 0.50x + 3.2$. [3]

(c) From your graph,

(i) find the total fare for a taxi ride of 7 km, [1]

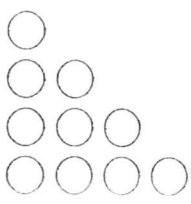
(ii) find the distance travelled by a taxi when the total fare is \$5.20. [1]

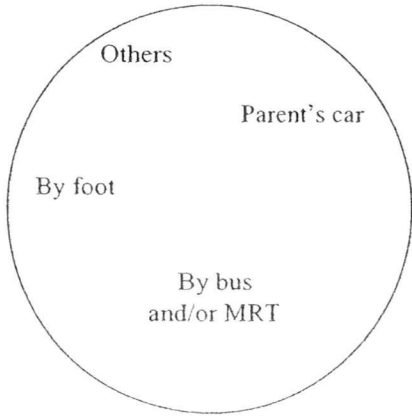
(d) What does the gradient of the graph represent? [1]

(e) Explain why the fare can never be less than \$3.20. [1]

- End of Paper -

Fairfield Methodist School (Secondary)
Secondary 1 Express
Paper 2
Mathematics
End-of-Year Examinations 2015

Qn No.	Workings	Description	Mark Allocation
1(a)	-28		B1
1(b)	Difference in altitude = $3640 - (-28)$ = 3668 m		B1
2	Commission earned = $1690 - 700$ = \$990 5.5% rep \$990 1% rep \$ $\frac{990}{5.5}$ 100% rep \$ $\frac{990}{5.5} \times 100$ = \$18000		M1 M1 A1
3(a)	US\$1 = S\$1.2647 US\$365 = S\$1.2647 $\times$ 365 = S\$461.62 (to nearest cent)	A1 cannot be awarded if answer is not given to nearest cent	M1 A1
3(b)	S\$100 = ₩83917 $\text{₩}1 = \text{S\$} \frac{100}{83917}$ $\text{₩}20000 = \text{S\$} \frac{100}{83917} \times 20000$ = S\$23.83 (to nearest cent)	A1 cannot be awarded if answer is not given to nearest cent	M1 A1
4(a)			B1
4(b)	<u>1st row</u> 4 , $1 + 2 + 3 + 4 = 10 = \frac{4 \times 5}{2}$ <u>2nd row</u> n , $1 + 2 + 3 + \dots + n = \frac{n \times (n+1)}{2}$	B2 if all correct B1 if 1 or 2 incorrect B0 if > 2 incorrect	B2
4(c)	$\frac{100 \times (100+1)}{2} = 5050$ circles		B1

Qn No.	Workings	Description	Mark Allocation
5(a)	Angle of sector representing <u>By parent's car</u> $\frac{70}{240} \times 360^\circ = 105^\circ$ <u>By bus and/or MRT</u> $\frac{100}{240} \times 360^\circ = 150^\circ$ <u>By foot</u> $\frac{30}{240} \times 360^\circ = 45^\circ$ <u>Others</u> $\frac{40}{240} \times 360^\circ = 60^\circ$	B2 if all correct B1 if 1 or 2 incorrect B0 if >2 incorrect	B2
5(b)		B2 if angles of all 4 sectors correct B1 if angles of 2 sectors incorrect B0 if angles of >2 sectors incorrect	B2
6(a)	Required perimeter $= (110 \times 2) + \left[2 \times \frac{1}{2} \times 2\pi(35) \right]$ $= 220 + 70(3.142)$ $= 439.94 \text{ m or } 440 \text{ m (to 3 s.f.)}$		M1 A1
6(b)	Area of curved parts of track $= 2 \left[\frac{1}{2} \pi (45^2) - \frac{1}{2} \pi (35^2) \right]$ $= 800(3.142)$ $= 2513.6 \text{ m}^2$ Area of straight parts of track $= 2 \times (110 \times 10)$ $= 2200 \text{ m}^2$ Area of running track $= 2513.6 + 2200$ $= 4713.6 \text{ m}^2 \text{ or } 4710 \text{ m}^2 \text{ (to 3 s.f.)}$		M1 M1 A1

Qn No.	Workings	Description	Mark Allocation
7(a)(i)	Phone bill under Student Price Plan A $= 28 + (2 - 1)(10)$ $= \$38$		M1 A1
7(a)(ii)	Phone bill under Student Price Plan B $= 42 + (120 - 100)(60)(0.002)$ $= 42 + 2.40$ $= \$44.40$		M1 A1
7(b)	She should consider whether she <u>makes more outgoing calls</u> or <u>uses more data</u> when making her decision.	Accept any other logical answers.	B1
8(a)	$\frac{2a+3b}{4} - \frac{a-2b}{3}$ $= \frac{3(2a+3b)}{12} - \frac{4(a-2b)}{12}$ $= \frac{3(2a+3b) - 4(a-2b)}{12}$ $= \frac{6a+9b-4a+8b}{12}$ $= \frac{2a+17b}{12}$	Change to common denominator Expand $3(2a+3b)$ or $-4(a-2b)$ correctly	M1 M1 A1
8(b)	$\frac{5(x+4)}{6} + \frac{x+2}{3} + 1$ $= \frac{5(x+4)}{6} + \frac{2(x+2)}{6} + \frac{6}{6}$ $= \frac{5(x+4) + 2(x+2) + 6}{6}$ $= \frac{5x+20+2x+4+6}{6}$ $= \frac{7x+30}{6}$	Change to common denominator Expand $5(x+4)$ or $2(x+2)$ correctly	M1 M1 A1
9(a)	$x + 2$		B1
9(b)(i)	$3x - 4$		B1
9(b)(ii)	$x(10) + (x + 2)(5) + (3x - 4)(2) = 44$ $10x + 5x + 10 + 6x - 8 = 44$ $21x + 2 = 44$ (Shown)	B1 for forming equation correctly B1 for correct simplification	B1)) B1)

Qn No.	Workings	Description	Mark Allocation
9(c)	$21x + 2 = 44$ $21x = 42$ $\therefore x = 2$	$44 - 2$ simplified correctly	M1 A1
10(a)	Volume of cuboid $= 8 \times 8 \times 6$ $= 384 \text{ cm}^3$ Volume of 4 cylinders $= 4 \times [\pi (\frac{3}{2})^2 (1)]$ $= 9(3.142)$ $= 28.278 \text{ cm}^3$ Total volume $= 384 + 28.278$ $= 412.278 \text{ cm}^3$ or 412 cm^3 (to 3 s.f.)		M1 M1 A1
10(b)	Total surface area of the model = surface area of cuboid + curved surface area of 4 cylinders $= 2(8 \times 8) + 4(8 \times 6) + 4[\pi(3)(1)]$ $= 128 + 192 + 12(3.142)$ $= 357.704 \text{ cm}^2$ or 358 cm^2 (to 3 s.f.)	Mark awarded for correct total S.A of cuboid (320) Mark awarded for correct total S.A of cuboid (37.704)	M1 M1 A1
11(a)(i)	$\angle PQR$ $= \frac{(8-2) \times 180^\circ}{8}$ (sum of int. $\angle$ s of octagon) $= \frac{1080^\circ}{8}$ $= 135^\circ$		M1 A1
11(a)(ii)	$\angle AEU = \angle PQR$ $= 135^\circ$ $\angle AED$ $= \frac{(5-2) \times 180^\circ}{5}$ $= \frac{540^\circ}{5}$ $= 108^\circ$		

Qn No.	Workings	Description	Mark Allocation
11(a)(ii)	$\angle DEU = 360^\circ - \angle AEU - \angle AED$ $(\angle \text{s at a pt.})$ $= 360^\circ - 135^\circ - 108^\circ$ $= 117^\circ$ Since $EU = AE$ and $ED = AE$, $EU = ED$ $\angle EDU$ $= \frac{180^\circ - 117^\circ}{2} \text{ (base } \angle \text{s of isos. } \Delta \text{)}$ $= \frac{63^\circ}{2}$ $= 31.5^\circ$		M1 M1 A1
11(b)	$\angle ARQ$ $= 180^\circ - \angle PQR \text{ (int. } \angle \text{s, } PQ \parallel AR \text{)}$ $= 180^\circ - 135^\circ$ $= 45^\circ$ $\angle ARS$ $= \angle QRS - \angle ARQ$ $= 135^\circ - 45^\circ$ $= 90^\circ \text{ (Proved)}$		B1 B1
12(a)	When $x = 5$, $y = p$: $(p) = 0.50(5) + 3.2$ $p = 2.5 + 3.2$ $= 5.7$		B1
12(b)- 12(c)	Refer to next page.		
12(d)	The gradient of the graph represents the <u>taxi fare charged per kilometer travelled by the taxi.</u>		B1
12(e)	The fare can never be less than \$3.20 because the <u>distance travelled by the taxi will always start from zero</u> , at which point the <u>(starting) fare will be \$3.20.</u>		B1