Candidate Name _____ Class | Index Number

YUHUA SECONDARY SCHOOL
End-of-Year Examination 2011
Secondary One Express

MATHEMATICS 4016/01

PAPER 1

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 10 printed pages.

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1. (a) Without using a calculator, estimate the value of $\frac{9.954 \times 2.703}{0.152}$ correct to one significant figure.

Answer: (a)_____ [2]

(b) Estimate the value of $\frac{\sqrt{9.8}}{\sqrt[3]{9}}$.

Answer: (b)_____ [2]

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2. Arrange the following numbers in ascending order:

$$-0.525,\ -0.5\dot{2},\ \frac{1}{3},\ 0.333$$

*Answer:*_____ [1]

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3. (a) Express 56 as a product if its prime factors.

Answer: (a) _____ [1]

(b) Find the highest common factor, *HCF* and the lowest common multiple, *LCM* of 6, 14 and 56.

Answer: (b) *HCF* = _____ [1]

LCM= _____ [1]

4. Simplify

(a) $5ab - 3bc + 2ba + 7cb$,

Answer (a) _____ [1]

(b) $\frac{7}{gh^2} \div \frac{21}{g^3h^4}$,

Answer (b) _____ [2]

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5. Given $a = 5$, $b = -6$ and $c = 1$, find the value of $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$.

Answer: _____ [1]

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6. Factorise the following expressions.

(a) $-2cd^2 + 8dc$,

Answer: (a) _____ [1]

(b) $a - b - ak + bk$.

Answer: (b) _____ [2]

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7. (a) Find the possible values of y for which $2y \leq 18$ if y is a square number.

Answer: (a) _____ [1]

(b) Find the possible values of x for which $\frac{2}{3}x > -2$ if x is a negative integer.

Answer: (b) _____ [1]

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8. (a) Solve the equation $\frac{3x}{4} - \frac{2+x}{2} = 1$.

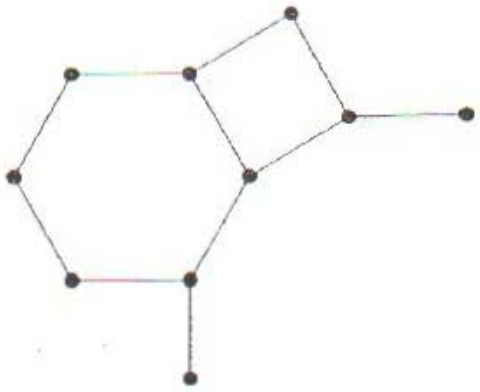
Answer: (a) $x =$ _____ [3]

(b) If $\frac{5x+y}{3x-2y} = \frac{6}{7}$, find the value of $\frac{x}{y}$.

Answer: (b) $\frac{x}{y} =$ _____ [3]

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9. The diagram shows a regular hexagon, a square and an incomplete regular polygon of n sides.



(a) Find the value of one interior angle of the regular hexagon.

Answer: (a) _____ ° [1]

(b) Find the value of n.

Answer: (b) n = _____ [3]

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10. (a) Express $1.25 : \frac{3}{16}$ in its simplest form.

Answer: (a) _____ : _____ [1]

(b) The ratio of the number of bookmarks Tom has to what Dick has is 3 : 4.
The ratio of the number of bookmarks Dick has to what Harry has is 5 : 6.
If Tom and Dick together have 595 bookmarks, how many bookmarks does Harry have?

Answer: (b) _____ bookmarks [2]

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11. The distance between Boon Lay MRT station and Simei MRT station is 35 km. A bus takes $\frac{7}{10}h$ to travel from Boon Lay MRT station to Simei MRT station.

(a) Calculate the speed of the bus in

(i) km/h

Answer: (a) (i) _____ km/h [1]

(ii) m/s

Answer: (a)(ii) _____ m/s [1]

(b) If a car travels at an average speed of 80 km/h, how long will it take to travel between the 2 stations? (Give your answer in minutes.)

Answer: (b) _____ minutes [1]

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12. Given the equation of a line is $-8x + 4y = 15$, find

(a) the gradient of the line,

Answer: (a) _____ [2]

(b) the y-intercept.

Answer: (b) _____ [1]

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13. A sales promoter of an electronics shop is paid a commission of 5% for every computer set that he sells. The selling price of a computer set is $2 420.

(a) In a particular month, the sales promoter sold 15 computer sets.

(i) Calculate the total commission received by the sales promoter.

Answer: (ai) $ _____ [2]

(ii) In that month, after paying the sales promoter his commission, the shop owner gets to keep 8% of the remaining amount as his earnings. Find the total amount the shop owner earned from this sale.

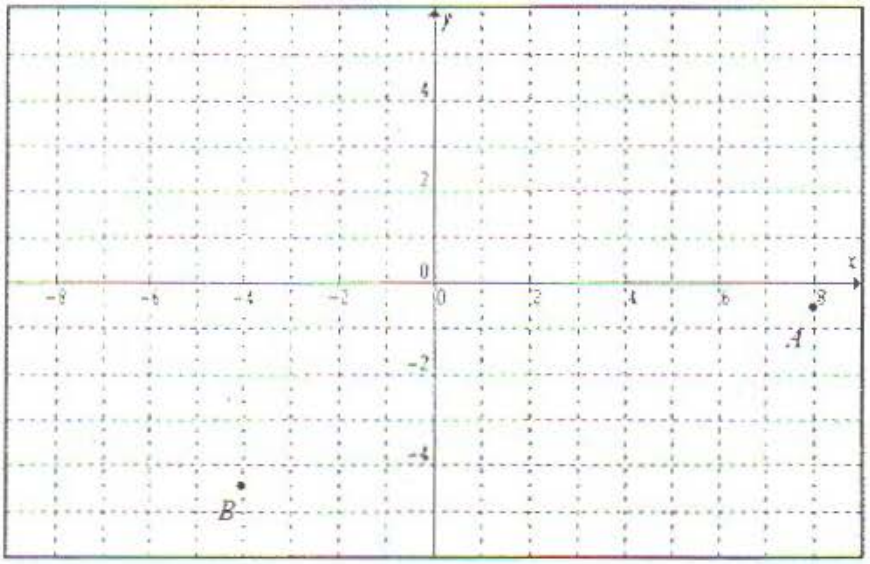
Answer: (aii) $ _____ [2]

(b) The selling price of a computer set is inclusive of a 10% GST. Find the price of a computer set without the inclusion of GST.

Answer: (b) $ _____ [2]

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14. On the diagram shown below, A, B and C are points on the grid.



(a) Find the coordinates of A and B.

Answer: (a) A= (,), B = (,), [2]

(b) On the grid, mark the point C (0, 5).

Answer: (b) shown in diagram [1]

(c) Find the area of ΔBOC.

Answer: (c) _____ *sq. units* [2]

(d) Find the gradient of AB.

Answer: (d) _____ [2]

(e) What is the value of p if the line AB passes through $(p,-1)$?

Answer: (e) p= _____ [1]

End of Paper 1

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Yuhua Secondary School
End-of-Year Examination 2011
Secondary One Express

Mathematics
Paper 1 (4016 / 1)

Marking Scheme

No.	Working	Marks allocated
1.	(a) $\frac{10.0\times 2.7}{0.15}$ $\approx \frac{27}{0.15}$ ≈ 180 (b) $\approx \frac{\sqrt{9}}{\sqrt[3]{8}}$ $\approx \frac{3}{2}$	A1 A1
2.	$-0.3, -0.323, 0.333, \frac{1}{3}$	B1
3.	(a) $56 = 2^3 \times 7$ (b) $HCF = 2$; $LCM = 168$	B1 A1, A1
4.	(a) $7ab + 4bc$ (b) $\frac{7}{gh^2} \times \frac{g^3h^4}{21}$ $= \frac{(gh)^2}{3}$	B1 M1 A1
5.	1	B1
6.	(a) $2cd(4-d)$ (b) $a(1-k)-b(1-k)$ $=(a-b)(1-k)$	B1 M1 A1

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No.	Working	Marks allocated
7.	(a) $y \leq 9$ $\therefore y = 1,4,9$	 B1
	(b) $x > -3$ $\therefore x = -2,-1$	 B1
8.	(a) $\frac{3x-2(2+x)}{4}=1$ $\frac{3x-4-2x}{4}=1$ $\frac{x-4}{4}=1$ $x-4=4$ $x=8$	 M1 M1 A1
	(b) $7(5x+y)=6(3x-2y)$ $35x+7y=18x-12y$ $17x=-19y$ $\frac{x}{y}=\frac{-19}{17}$	 M1 M1 A1
9.	(a) $\text{int}\angle = \frac{(6-2)180}{6}$ $=120°$	 B1
	(b) $\text{int}\angle = 360-90-120$ $=150°$ $\therefore \frac{(n-2)180}{n}=150$ $180n-360=150n$ $30n=360$ $n=12$	 B1 M1 A1

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No.	Working	Marks allocated
10.	(a) 20: 3	B1
	(b) Dick's bookmark $= \frac{595}{7} \times 4$ $= 340$	M1
	Harry's bookmark $= \frac{340}{5} \times 6$ $= 408$	A1
11.	(a) (i) Speed $= 35 \div \frac{7}{10}$ $= 50 km/h$	B1
	(ii) $= \frac{\frac{50km}{1h}}{1 \times 3600}$ $= 13\frac{8}{9} m/s$	B1
	(b) Time taken $= \frac{\frac{35}{80} \times 60}{}$ $= 26\frac{1}{4} \min s$	B1
12.	(a) $y = 2x + \frac{15}{4}$ gradient = 2	M1 A1
	(b) y-intercept $= 3\frac{3}{4}$	B1

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No.	Working	Marks allocated
13.	(a) (i) Total commission $= \frac{5}{100} \times (2420 \times 15)$ $= \$1815$ (ii) Total amount $= \frac{8}{100} \times (36300 - 1815)$ $= \$2758.80$ (b) Price of computer $= \frac{2420}{110} \times 100$ $= \$2200$	 M1 A1 M1 A1 M1 A1
14.	(a) $A(8, -0.5), B(-4, -4.5)$ (c) Area of ΔBOC $= \frac{1}{2} \times 5 \times 4$ $= 10 sq\ units$ (d) gradient of AB $= \frac{-0.5 + 4.5}{8 - 4}$ $= \frac{1}{3}$ (e) $p=6$	B1, B1

End of Paper 1

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Candidate Name _____ Class | Index Number

YUHUA SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2011
Secondary One Express

MATHEMATICS **4016/02**
PAPER 2

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 11 printed pages.

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1. The selling price of a Toyota Vios is $52 250 and there are two different payment schemes available to Peter who wants to buy a car.

Payment Scheme *A*:
1.5 % discount if payment by cash.

Payment Scheme *B*:
20% down payment, balance at simple interest of 2.5 % per annum payable in 3 years

(a) For Payment Scheme *B*, calculate

(i) the down payment payable.

Answer: (ai) $_____ [1]

(ii) Peter's monthly instalment.

Answer: (aii)$ _____ [2]

(b) Find his savings as a percentage of the selling price for Payment Scheme *B* if he chooses Payment Scheme *A*.

Answer:(b) _____ % [3]

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2. The tickets for a concert were priced at \$3, \$5 and \$8. The number of \$8 tickets sold was x. The number of \$5 tickets sold was twice the number of \$8 tickets. The number of \$3 tickets sold was 30 more than the number of \$5 tickets.

(a) Find an expression in terms of x for the total amount of money received from sale of the tickets.

Answer: (a) \$_____ [1]

(b) Given that the total sale of tickets was \$8010, form an equation in x. Solve this equation and hence find the total number of tickets sold.

Answer: (b) _____ tickets [2]

3. (a) Two numbers were given as $m^2 \times n$ and $m \times n^5$. Find the cube root of their product in terms of m and n.

Answer: (a) _____ [2]

(b) Three light houses flash their lights every 20 seconds, 30 seconds and 45 seconds respectively. Given that they flash together at 7pm, when will they next flash together?

Answer: (b) _____ [2]

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4. (a) Evaluate the following, rounding off your answer to 2 significant figures.

$$\frac{\sqrt{2.15+3.26}}{31.1\times 42.2}$$

Answer: (a) _____ [1]

(b) Mr Lo wishes to spend at most \$55 000 in an advertising campaign. \$38 500 is to be spent on TV commercials and the remainder on T-shirts which will be given away to customers. The T-shirts will cost the company \$2.80 each.

(i) Form an inequality in x.

Answer: (bi) _____ [1]

(ii) Find the greatest number of T-shirts that can be given away.

Answer: (bii) _____ [1]

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5. David walks his brother to school everyday at a speed of $(x+1)m/s$. If the distance between his house and the school is $6000m$,

(a) Find, in terms of x, the time taken in seconds for David to reach school.

Answer: (a) _____ *seconds* [1]

(b) If the time taken for David to reach the school is 40 minutes, form an equation in terms of x and show that it reduces to $\frac{5}{x+1} = 2$.

Answer: (b) [1]

(c) Solve the equation $\frac{5}{x+1} = 2$.

Answer: (c) $x =$ _____ [2]

(d) If David takes $\dot{5}$ minutes to drop his brother off then spent 30 minutes walking home, find the average speed for his journey from home to school and back.

Answer: (d) _____ *m/s* [2]

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6. (a) Construct a parallelogram $PQRS$ in which $PQ = 8$ cm, $\angle PQR = 100°$ and $QR = 5$ cm.

Answer: (a) [2]

(b) Measure $\angle QRS$.

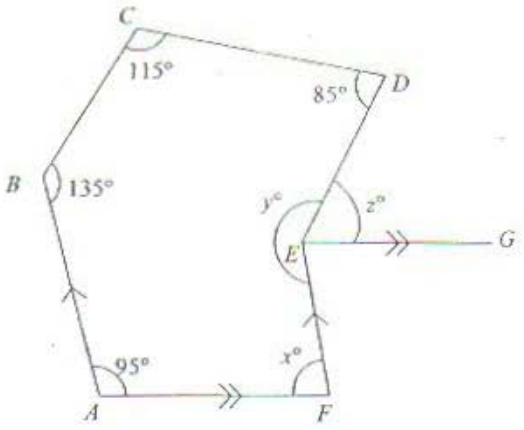
Answer (b) $\angle QRS =$ _____° [1]

(c) Construct the perpendicular bisector of PQ. [1]

(d) Construct the angle bisector of $\angle SPQ$. [1]

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7. In the diagram below, AB is parallel to FE, AF is parallel to EG, $\angle ABC = 135°$, $\angle BCD = 115°$, $\angle CDE = 85°$, $\angle FAB = 95°$



Find the values of

(a) x,

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

(b) y,

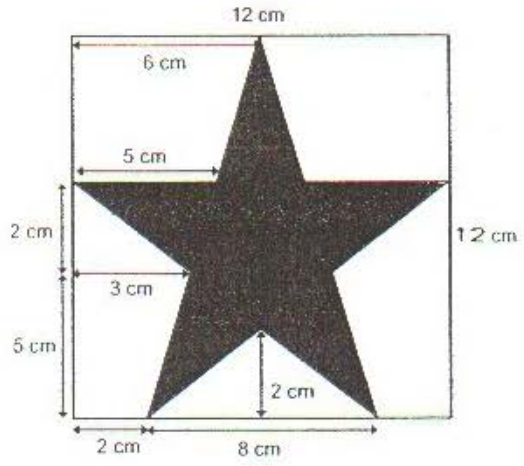
Answer: (b) $y =$ _____ [2]

(c) z.

Answer: (c) $z =$ _____ [1]

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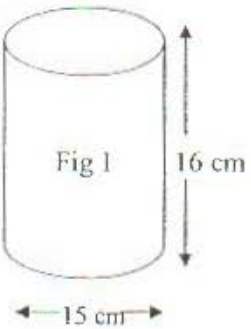
8. A square construction paper was cut as shown below so that a symmetrical star was obtained. Find the area of the star that was cut out.

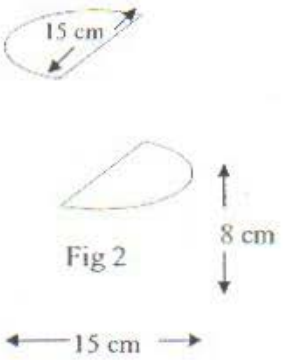


Answer _____ cm^2 [5]

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9. A solid cylinder is made from plastic. The height and diameter of the cylinder measured are 16 cm and 15 cm respectively. (Use $\pi = 3.142$)





(a) Calculate the volume of plastic needed to make the cylinder (Fig 1 as shown above) correct to 3 significant figures.

Answer: (a) _____ cm^3 [2]

(b) Ten such cylinders are melted to make cubes whose sides are 13 mm each. What is the maximum number of cubes that can be made from the 10 cylinders?

Answer :(b) _____ cubes [2]

(c) A quarter of the cylinder is cut off from the cylinder. Calculate the total surface area of the cylinder left after the cut. (Fig 2 as shown above)

Answer :(c) _____ cm^2 [3]

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10. *Answer the whole of this question on the sheet of graph paper provided on page 11.*

Given the equation $y = 3x + 8$,

x	-3	-2	0	2
y	a	2	8	14

(a) Find the value of a.

Answer :(a) $a =$ _____ [1]

(b) Using a scale of 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1unit on the y-axis, draw the graph of $y = 3x + 8$ for the values of x in the range $-3 \leq x \leq 2$. [3]

(c) Use your graph to find the value of y when $x = 1.5$.

Answer :(c) $y =$ _____ [1]

(d) On the same graph, draw the line $y = 5$. [1]

(e) Find the coordinates of the point of intersection of the lines $y = 5$ and $y = 3x + 8$.

Answer :(e) (_____, _____) [1]

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Yuhua Secondary School
End-of-Year Examination 2011
Secondary One Express

Mathematics
Paper 2(4016 / 2)

Marking Scheme

No.	Working	Marks allocated
1.	(a) (i) $\frac{20}{100} \times 52250$ $= \$10450$	B1
	(ii) Balance amount $= 52250 - 10450$ $= \$41800$	M1
	$I = \frac{41800 \times 2.5 \times 3}{100} = \$3135$	
	monthly installment $= \frac{41800 + 3135}{36}$ $= \$1248.19$	A1
	(b) Amount paid under Scheme A $= \$51466.25$ Amount paid under Scheme B $= \$55385$	M1
	%savings $= \frac{55385 - 51466.25}{55385} \times 100 = 7.08\%$	M1, A1
2.	(a) $24x + 90$	B1
	(b) $24x + 90 = 8010$	M1
	$24x = 7920$ $x = 330$ Total number of tickets $= 330 + 2(330) + (30 + 330) = 1680$	A1

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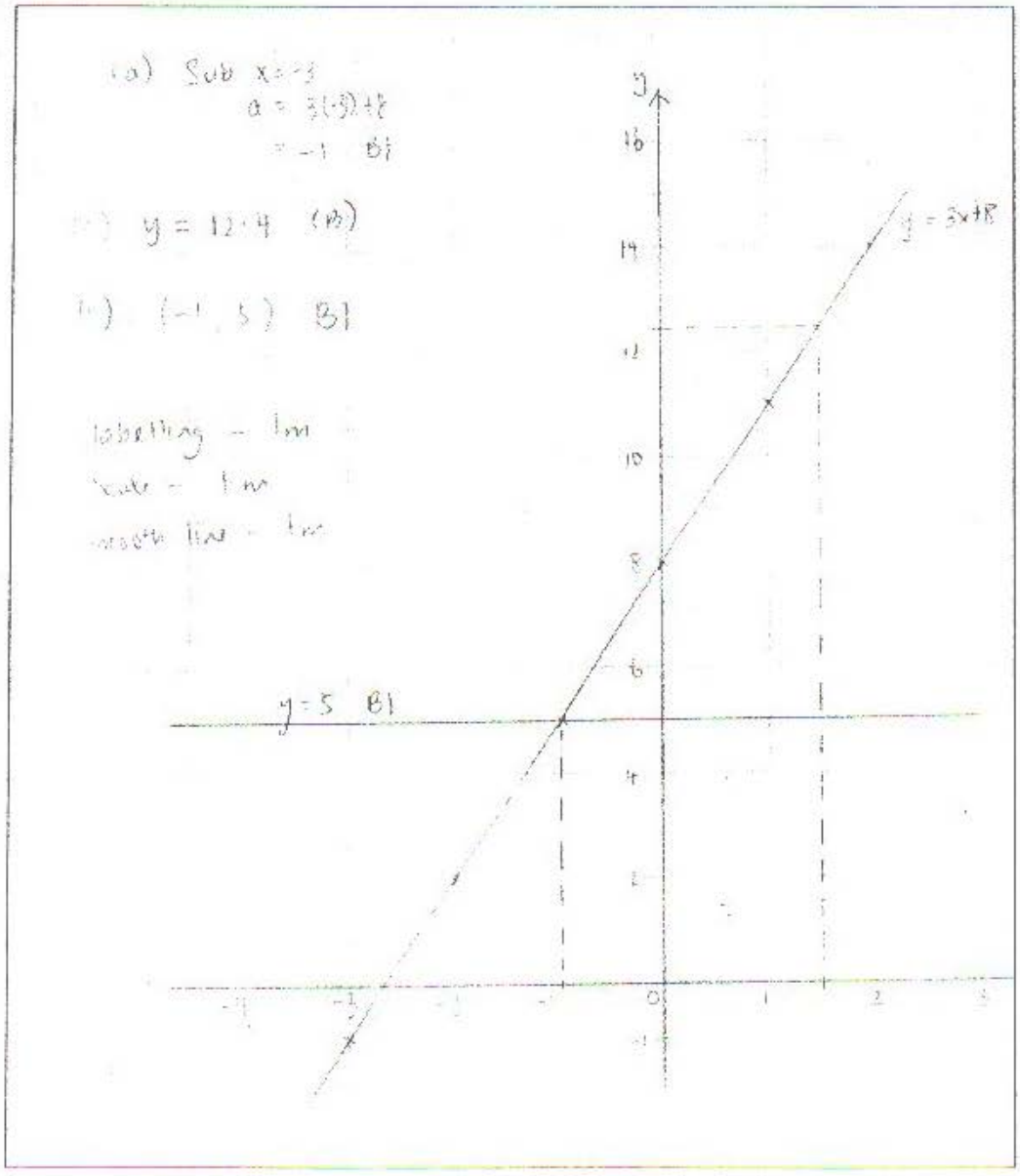
No.	Working	Marks allocated
3.	(a) $\sqrt[3]{m^3 \times n^6}$ $= mn^2$ (b) $LCM = 180$ seconds $= 3$ minutes Time = 7.03 pm	 M1 A1 M1 A1
4.	(a) 0.0018 (b) (i) $2.8x + 38500 \leq 55000$ (ii) $x \leq 5892.85$ $\therefore x \approx 5892$	B1 B1 A1
5.	(a) Time taken $= \frac{6000}{x+1}$ $\frac{6000}{x+1} = 40 \times 60$ (b) $\frac{6000}{x+1} = 2400$ $\frac{5}{x+1} = 2(shown)$ (c) $5 = 2(x+1)$ $5 = 2x + 2$ $2x = 3$ $x = 1.5$ (d) Total distance traveled = 6000 x 2 = 12000 m Total time taken = 40 + 5 + 30 = 75 mins = 4500 secs Average speed $= \frac{12000}{4500}$ $= 2\frac{2}{3} m/s$	B1 A1 M1 A1 M1 A1

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No.	Working	Marks allocated
6.	(a),(c),(d)	B2, B1, B1
	(b) $\angle QRS = 78°$	B1
7.	(a) $x = 180 - 95$ (int $\angle$s, // lines) $= 85$	B1
	(b) sum of int. angles in hexagon = (6-2)180 = 720 $\therefore y = 7200 - 515$ $= 205$	M1 A1
	(c) $z = 360 - 205 - 85$ (alt $\angle$s, // lines, sum of $\angle$s, in Δ) $= 70$	B1
8.	Area of square = 12 x 12 = 144 cm^2	M1
	Area of top 2 larger trapeziums = $2 \times \frac{1}{2} \times (5+6) \times 5 = 55$ cm^2	M1
	Area of3 triangles = $\frac{1}{2} \times 2 \times 3 \times 2 + \frac{1}{2} \times 8 \times 2 = 14$ cm^2	M1
	Area of smaller trapeziums = $\frac{1}{2}(2+3) \times 5 \times 2 = 25$ cm^2	M1
	Area of star = 144 – 55- 14 – 25 = 50 cm^2	A1
9.	(a) Volume of cylinder $= 3.142 \times 7.5^2 \times 16 = 2827.8$ cm^3	A1
	(b) Max number of cubes $= \frac{28278}{1.3^3} = 12871$	M1, A1
	(c) Total surface area $= (3.142 \times 7.5^2) + (15 \times 8) + (3.142 \times 7.5) + \frac{3}{4}(2 \times 3.142 \times 7.5 \times 16)$	M2
	$= 1040$ cm^3	A1

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No.	Working	Marks allocated
10.	(a) $a = -1$	B1
	(b) See graph below	B3
	(c) $y = 12.4$	B1
	(d) See graph below	B1
	(e) (-1 , 5)	B1



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