Name:	Class: Sec 1 _____	Class Register No:_____

中正中学

CHUNG CHENG HIGH SCHOOL (MAIN)

50

Parent's Signature

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2011 END-OF-YEAR EXAMINATION
SECONDARY 1

MATHEMATICS **4016/02**

Paper 2 **7 October 2011**

Additional Materials: Writing paper(4 sheets) **1 hour 15 minutes**
Graph paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

Write your name, class and class register number on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction 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 50.

This paper consists of 4 printed pages (including this cover page)

DO NOT TURN THE PAGE OVER UNTIL YOU ARE TOLD TO DO SO

[Turn Over

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1. The interior angle of a regular polygon is 165°. How many sides does it have ? [3]

2. Simplify $4x-[5(4y-x)-9(y+2x)]$ [3]

3. If $k=\frac{x+y}{3}$, find x when $k=12$, $y=4$. [3]

4. Factorise $6mq-rp+3mp-2qr$ completely. [3]

5. In preparation for the Great Singapore Sale, a store assistant accidentally raised the price of digital camera by 15% instead of lowering it by 20%. As a result, a customer who bought this camera was overcharged by $ 161. Find the original price of the digital camera. [3]

6 Solve the inequality $3x-4\leq 16$ [2]

(a) If x is a natural number, represent the solution on a number line. [2]

(b) State the greatest value of x if

(i) x is a prime number, [1]

(ii) x is a rational number. [1]

7. (a) A farmer has x tomato plants. He estimates that each plant will produce 5.5 kg of tomatoes. Write an expression, in terms of x, for the total mass of tomatoes that he expects to be produced. [1]

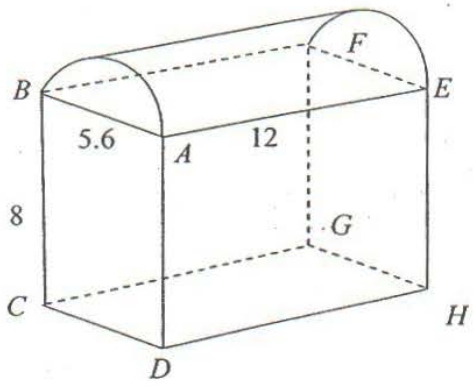
(b) He intends to apply 300ml of liquid fertiliser to each plant. The fertiliser is sold in containers each holding 6 litres and costing $135 each. Write down an expression, in terms of x, for the number of containers of fertiliser he must buy. [2]

(c) If the total cost of the fertiliser is $810, form an equation in x and solve it to find the number of tomato plants that the farmer has. [3]
[1litre = 1000ml]

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8. The diagram shows a closed metal storage container made up of a cuboid joined to half of a cylinder. Given that $AB = 5.6$ m, $BC = 8$ m and $AE = 12$ m.

[Take π to be $\frac{22}{7}$]



(a) Calculate the volume of the container, giving your answer in m^3. [3]

(b) The exterior surfaces of the container is to be painted. Find the total surface area to be painted in m^2. [3]

9. (a) Given that $x : y = 2 : 3$ and $y : z = 4 : 5$, find $x : y : z$. [1]

(b) If z has \$14 more than x, find the total sum of money that is shared between x, y and z ? [2]

10. Solve the equation

$$3 + \frac{2}{x+6} = 1 - \frac{6}{x+6}$$ [3]

11. Linda had sweets of 3 different flavours. There were 84 mango flavoured, 98 grape flavoured and 112 kiwi flavoured sweets. She packed an equal number of each flavour into small packets without any leftover.

(a) What was the maximum number of packets? [2]

(b) How many grape flavoured sweets were there in each packet ? [1]

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

Given the equation $y = -3x + 4$,

x	-4	0	2
y	16	4	p

(a) find p. [1]

(b) Using a scale of 2cm to represent 1 unit on x-axis and 1cm to represent 1unit on the y-axis, draw the graph of $y = -3x + 4$. [3]

(c) By using your graph, find the values of

(i) y when $x = 2$ [1]

(ii) x when $y = 6.4$ [1]

(d) From your graph, is (1 , 1) a solution to $y = -3x + 4$? Give an explanation for your answer. [2]

- End of Paper -

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Marking Scheme
Sec 1 EOY Paper 2 (2011)

1. The interior angle of a regular polygon is 165°. How many sides does it have ? [3]

$Exterior \angle = 180^0 - 165^0$

$= 15^0$ *M*1cao

$No.of\ sides = \frac{360}{15}$ *M*1cao

$= 24$ *A*1

$\frac{(n-2)180}{n} = 165$ *M*1cao

$(n-2)180 = 165n$

$180n - 165n = 360$

$15n = 360$

$n = \frac{360}{15}$ *M*1cao

$= 24$

$No.of\ sides = 24$ *A*1

2. Simplify $4x-[5(4y-x)-9(y+2x)]$ [3]

$4x-[5(4y-x)-9(y+2x)] = 4x-(20y-5x-9y-18x)$ *M*1cao

$= 4x-(11y-23x)$

$= 4x-11y+23x$ *M*1

$= 27x-11y$ *A*1

3. If $k = \frac{x+y}{3}$, find x when $k = 12$, $y = 4$. [3]

. when $K = 12$, $y = 4$.

$K = \frac{x+y}{3}$

$12 = \frac{x+4}{3}$ *M*1cao

$12 \times 3 = x+4$ *M*1cao

$x = 36-4$

$= 32$ *A*1

4. Factorise $6mq - rp + 3mp - 2qr$ completely. [3]

$6mq - rp + 3mp - 2qr = 6mq + 3mp - 2qr - rp$

$= 3m(2q+p) - r(2q+p)$ *M*1cao, *M*1cao

$= (2p+q)(3m-r)$ *A*1

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5. In preparation for the Great Singapore Sale, a store assistant accidentally raised the price of digital camera by 15% instead of lowering it by 20%. As a result, a customer who bought this camera was overcharged by $ 161. Find the original price of the digital camera. [3]

Let $x be the original price of the camera.

Price when raised by 15% = $1.15 x
Price when reduced by 20% = $0.8 x
Price difference = $1.15 x – $0.8 x M1cao
= 0.35 x
0.35 x = 161 M1cao
x = 460
The original price of the digital camera is $460 A1

6 Solve the inequality $3x-4\le 16$ [2]

(a) If x is a natural number, represent the solution on a number line. [2]

(b) State the greatest value of x if

(i) x is a prime number, [1]

(ii) x is a rational number. [1]

$3x-4\le 16$
$3x\le 16+4$ *M1cao*
$x\le \frac{20}{3}$
$x\le 6\frac{2}{3}$ *A1*

(*a*)

Missing or wrong points,*x*, ⟶
-0.5 marks each, max -2marks
Presentation



(*b*)(*i*) *greatestvalue* $x=5$ *A1* *OR* (*i*) 5

(*ii*) *greatestvalue* $x=6\frac{2}{3}$ *A1* (*ii*) $6\frac{2}{3}$

7. (a) A farmer has x tomato plants. He estimates that each plant will produce 5.5 kg [1]

[Turn Over

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of tomatoes. Write an expression, in terms of x, for the total mass of tomatoes that he expects to be produced.

(b) He intends to apply 300ml of liquid fertiliser to each plant. The fertiliser is sold in containers each holding 6 litres and costing \$135 each. Write down an expression, in terms of x, for the number of containers of fertiliser he must buy. [2]

(c) If the total cost of the fertiliser is \$810, form an equation in x and solve it to find the number of tomato plants that the farmer has. [3]
[1litre = 1000ml]

(a) Total mass = $5.5x$ kg B1

(b) Amount of fertiliser needed = $300x$ *ml* M1cao

No of container = $\frac{300x}{6000}$ A1

$= \frac{x}{20}$

(c)

$\frac{x}{20} \times 135 = 810$ *M1*

$x = \frac{810 \times 20}{135}$ *M1cao*

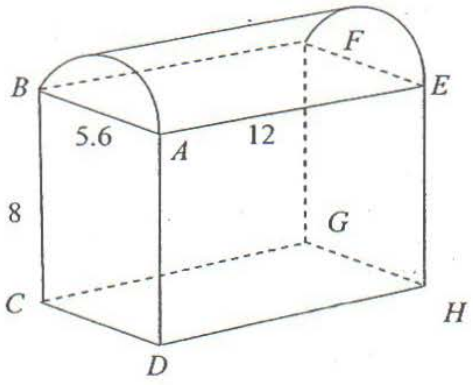
$= 120$

$\therefore$ *no.of tomato plants farmer has* $= 120$ *A1*

8. The diagram shows a closed metal storage container made up of a cuboid joined to half

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of a cylinder. Given that $AB = 5.6$ m, $BC = 8$ m and $AE = 12$ m.
[Take π to be $\frac{22}{7}$]



(a) Calculate the volume of the container, giving your answer in m^3. [3]

(b) The exterior surfaces of the container is to be painted. Find the total surface area to be painted in m^2. [3]

(a)

$$Base\ area = \frac{1}{2}\pi(\frac{5.6}{2})^2 + 8 \times 5.6 \qquad M1cao$$
$$= 12.32 + 44.8$$
$$= 57.12\ m^2$$
$$Vol.of\ container = 57.12 \times 12 \qquad M1$$
$$= 685.44\ m^3 \qquad A1$$

(b)

$$Total\ surface\ area = 2 \times 57.12 + [8 + 8 + 5.6 + \frac{1}{2}(\frac{22}{7})(5.6)] \times 12 \qquad M1, M1cao$$
$$= 114.24 + 30.4 \times 12$$
$$= 114.24 + 364.8$$
$$= 479.04\ m^3 \qquad A1$$

9. (a) Given that $x : y = 2 : 3$ and $y : z = 4 : 5$, find $x : y : z$. [1]

(b) If z has \$14 more than x, find the total sum of money that is shared between x, y and z ? [2]

(a) $x : y = 2 : 3$
$= 8 : 12$
$y : z = 4 : 5$
$= 12 : 15$
$\therefore x : y : z = 8:12:15$ **B1**

7 units	\$14
$\therefore$ 35 units	$\$(\frac{14}{7} \times 35)$
	= \$70

(b) $Total\ sum\ of\ money = \frac{14}{7} \times (8 + 15 + 12)$ **M1cao**

= \$70 **A1**

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10. Solve the equation [3]

$$3+\frac{2}{x+6}=1-\frac{6}{x+6}$$

$$3+\frac{2}{x+6}=1-\frac{6}{x+6}$$

$$\frac{2}{x+6}+\frac{6}{x+6}=1-3 \qquad M1cao$$

$$\frac{2+6}{x+6}=-2$$

$$8=-2(x+6) \qquad M1cao$$

$$8=-2x-12$$

$$2x=-12-8$$

$$x=-10 \qquad A1$$

11. Linda had sweets of 3 different flavours. There were 84 mango flavoured, 98 grape flavoured and 112 kiwi flavoured sweets. She packed an equal number of each flavour into small packets without any leftover.

(a) What was the maximum number of packets? [2]

(b) How many grape flavoured sweets were there in each packet ? [1]

(a) $84=2^2\times3\times7$

$98=2\times7^2$ M1cao

$112=2^4\times7$

$HCF\ of\ (84,98,112)=2\times7$

$=14$

$\therefore Max.no\ of\ packets=14 \qquad A1$

(b) $No.of\ grape\ sweets\ in\ each\ packet=98\div14$

$=7 \qquad A1$

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

Given the equation $y = -3x + 4$,

x	-4	0	2
y	16	4	p

(a) find p. [1]

(b) Using a scale of 2cm to represent 1 unit on x-axis and 1cm to represent 1unit on the y-axis, draw the graph of $y = -3x + 4$. [3]

(c) By using your graph, find the values of

(i) y when $x = 2$ [1]

(ii) x when $y = 6.4$ [1]

(d) From your graph, is (1 , 1) a solution to $y = -3x + 4$? Give an explanation for your answer. [2]

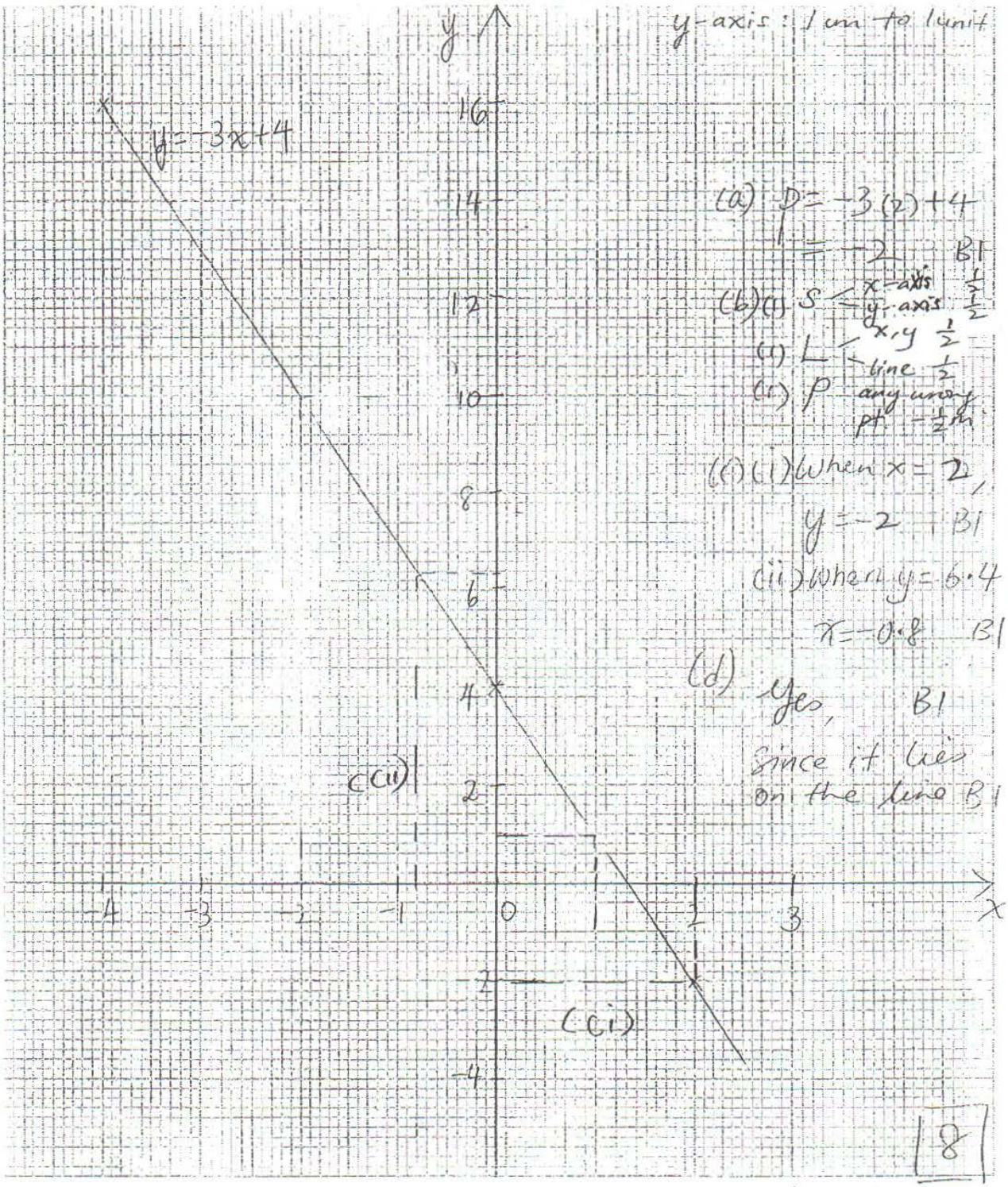
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Name _____ Index No. _____

Subject _____ Class _____ Date _____

8-12

Scale : x-axis : 2cm to 1unit
y-axis : 1cm to 1unit



(a) $D = -3(2) + 4$
$= -2$ B1

(b)(i) S $\leftarrow$ x-axis $\frac{1}{2}$
y-axis $\frac{1}{2}$
x, y $\frac{1}{2}$

(ii) L $\leftarrow$ line $\frac{1}{2}$

(iii) P $\leftarrow$ any unary pt $\frac{1}{2}$

(c)(i) When $x = 2$,
$y = -2$ B1

(ii) When $y = 6.4$
$x = -0.8$ B1

(d) Yes, B1
Since it lies on the line B1

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