Class	Register Number	Name

CHIJ SECONDARY (TOA PAYOH)
MID YEAR EXAMINATION 2008
SECONDARY 2 (EXPRESS/SPECIAL)

MATHEMATICS

Paper 1 — 7 May 2008

Candidates answer on the Question Paper. — **1 hour**

READ THESE INSTRUCTIONS FIRST

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

Answer **all** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.
Show all your working in the space below the question.
Omission of essential working will result in loss of marks.

The total marks for this paper is 50.

You are expected to use an electronic calculator to evaluate 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 EXAMINER'S USE
PAPER 1	
TOTAL	**50**

This document consists of 9 printed pages including the cover page.

[Turn over

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PAPER 1 [50 marks]

Answer ALL the questions. All working must be clearly shown in the space provided.

1. Factorise completely

(a) $14pr - 21rpq - 7p$

(a) _____ [1]

(b) $x(x-y)+3(y-x)$

(b) _____ [1]

(c) $3a^2 + 6ab - 4ac - 8bc$

(c) _____ [2]

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2 (a) (i) Factorise $x^2 + 2x + 1$.

(a)(i) _____ [1]

(a) (ii) Hence, factorise $x^2 - y^2 + 2x + 1$.

(a)(ii) _____ [2]

(b) The expression $2x^3 + x^2 - 7x - 6$ factorises into a product of three factors. Given that two of the factors are $(x + 1)$ and $(x - 2)$, write down its third factor.

(b) _____ [1]

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3. Expand and simplify the following

(a) $(2a+3)(3a-5)$

(a) _____ [1]

(b) $\left(x^2 - x\sqrt{3}\right)\left(x^2 + x\sqrt{3}\right)$

(b) _____ [1]

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4. Using algebraic rules evaluate.

(a) $9999^2 - 3999^2$

(a) _____ [1]

(b) $579^2 - 574 \times 584$

(b) _____ [2]

5. Simplify the following

(a) $\frac{4a}{12b} \times \frac{15ac^2}{(5b)^2} \div \frac{c^2}{b^4}$

(a) _____ [2]

(b) $\frac{(x^2 - xy) + (xy - y^2)}{x^2 - 5xy - 6y^2}$

(b) _____ [2]

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

(a) $\frac{3}{q-p} - \frac{4}{q}$

(a) _____ [2]

6. (b) $\frac{x}{x+1}+\frac{3x}{x-1}$

(b) _____ [2]

(c) $\frac{5}{x-3}+\frac{11}{9-x^2}$

(c) _____ 24 [2]

7. Solve the following equations

(a) $\frac{3}{e} = \frac{4e}{27}$

(a) _____ [2]

(b) $4x^2 = 7x$

(b) _____ [2]

(c) $3x^2 + 13x - 10 = 0$

(c) _____ [2]

(d) $(x+2)(x-3) = (x+2)$

(d) _____ [2]

8. Solve the equations

(a) $\frac{x-1}{3}+\frac{x+5}{2}=8$

(a) _____ [2]

(b) $\frac{3}{x-4}-\frac{x-5}{(x-4)(2x+3)}-\frac{4}{2x+3}=0$

(b) _____ [3]

9. Solve the simultaneous equations

$$5x-6y=27$$
$$3x-2y=13$$

25

_____ [3]

10. (a) Given that $z = \sqrt{\frac{2x}{3}} + 7y$, express x in terms of z and y.

(a) _____ [2]

(b) Given that $y + 2a = \frac{3y + 7}{a}$, make y the subject of the formula.

(b) _____ [2]

11. The resurfacing of a section of an expressway can be completed by 5 men in $8\frac{3}{4}$ hr. Assuming that the men worked at the same rate, how many men will be needed if the same project is to be completed in $5\frac{1}{4}$ hours?

_____ [2]

12. y varies inversely as the square of x and directly as the cube of z and the variables are connect by the equation $y = \frac{kz^3}{x^2}$, where k is a constant.

Given that

x	1	2	b
y	10	20	40
z	a	8	32

(a) Find the value of k.

(a) _____ [1]

(b) Hence find the values of

(i) a

(b)(i) _____ [2]

(ii) b

(b)(ii) _____ [2]

End of Paper 1

Mid-Year 2008 Mathematics Paper 1

Qn	Answers	Qn	Answers	Qn	Answers
1(a)	$7p(2r-3rq-1)$	5(a)	$\frac{a^2b}{5}$	8(b)	$x=-30$
1(b)	$(x-y)(x-3)$	5(b)	$\frac{x-y}{x-6y}$	9	$x=3$ or $y=-2$
1(c)	$(a+2b)(3a-4c)$	6(a)	$\frac{4p-q}{q(q-p)}$	10(a)	$x=\frac{3(z-7y)^2}{2}$
2(a)(i)	$(x+1)^2$	6(b)	$\frac{2x(2x+1)}{(x+1)(x-1)}$	10(b)	$y=\frac{7-2a^2}{a-3}$
2(a)(ii)	$(x+1+y)(x+1-y)$	6(c)	$\frac{5x+4}{(x+3)(x-3)}$	11	9 men
2(b)	$(2x+3)$	7(a)	± 4.5	12(a)	$k=\frac{5}{32}$
3(a)	$6a^2-a-15$	7(b)	$x=0$ or $x=1\frac{3}{4}$	12(b)(i)	$a=4$
3(b)	x^4-3x^2	7(c)	$x=\frac{2}{3}$ or $x=-5$	12(b)(ii)	$b=\pm 11.3$ (3 s.f.)
4(a)	83988000	7(d)	$x=-2$ or $x=4$		
4(b)	25	8(a)	$x=7$		

Class	Register Number	Name

CHIJ SECONDARY (TOA PAYOH)
MID YEAR EXAMINATION 2008
SECONDARY 2(EXPRESS/SPECIAL)

MATHEMATICS

Paper 2 — 7 May 2008

Candidates answer on the Question Paper. — **1 hour 30 minutes**

READ THESE INSTRUCTIONS FIRST

Write your class, register number and name on all the work you hand in.
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Answer **all** questions.
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The total marks for this paper is 50.

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	FOR EXAMINER'S USE
PAPER 2	
TOTAL	**50**

This document consists of 9 printed pages including the cover page.

[Turn over

PAPER 2 [50 marks]

Answer ALL the questions. All working must be clearly shown in the space provided.

1. (a) Given that y is inversely proportional to $(x + 3)$ and that $y = 4$ when $x = 2$, express y in terms of x.

(a) _____ [2]

(b) y varies directly as x^3. It is known that $y = 15$ when $x = m$. Find the value of y when the value of x is halved.

(b) _____ [3]

2. Given that $x^2 + y^2 = 25$ and $xy = 12$, find the value of $(2x + 2y)^2$.

[3]

3. If $ax^2 + bx + 8 = (3x + 2)(x + k)$, find the values of a, b and k.

[3]

4. Simplify the following, leaving your answers in the simplest form.

(a) $\left(\frac{2}{x}-\frac{1}{y}\right)\div\left(\frac{4y}{x}-\frac{x}{y}\right)$

(a) _____ [3]

(b) $2(a-b)^2-a^2+b^2$

(b) _____ [3]

(c) $\frac{2}{x^2-1}-\frac{x-1}{x^2-2x-3}$

(c) _____ [3]

5. If $\begin{cases} y = x^2 - 4x - 44 \\ y = -2x + 4 \end{cases}$ find the values of y.

_____ [4]

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6. If $a = \dfrac{4x+3}{x-1}$ and $b = \dfrac{x-2}{3x}$, express b in terms of a.

_____ [4]

7. A piece of wire of length 36 cm is cut into two parts. One part, x cm long, is bent into a square and the other part is bent into a circle. If the length of a side of the square is equal to the radius of the circle, find x, leaving your answer in terms of π.

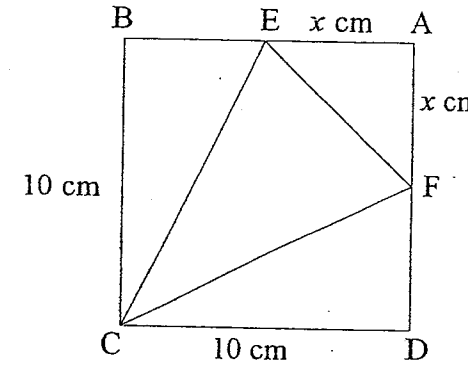
[3]

8. If $(5a-1)$ is divided by b, the result is 3 and the remainder is 4. If $(b+8)$ is divided by a, the result is 3 and the remainder is $\frac{1}{4}a$. Form two equations in a and b and solve for a and b.

[4]

9. In the figure, ABCD is a square of side 10 cm. If AE = AF = x cm and the area of ΔCEF is 32 cm^2,

(a) write down an equation in x and show that it reduces to $x^2 - 20x + 64 = 0$. [2]



(b) solve the equation $x^2 - 20x + 64 = 0$.

(b) _____ [2]

(c) Explain why you would reject one of the two solutions. [1]

10. (a) In 2001 petrol cost 90 cents per litre. Calculate the number of litres of petrol that could be bought for \$36.00.

(a) _____ [1]

(b) In 2002 the price of petrol was increased by x cents per litre. Write down an expression, in term of x for

(i) the cost of one litre of petrol in 2002,

(ii) the number of litres that could be bought for \$24.00 in 2002.

(b)(i) _____ (ii) _____ [1]

(c) In 2003 the price was increased by a further x cents per litre. The quantity of petrol that cost \$24.00 in 2002 now costs \$25.50.
Form an equation in x and solve for x.

(c) _____ [3]

11. In a lock factory, Superlocks are made by Alan, an apprentice, and Mr Ball, his instructor.

(a) In January, Alan made a Superlock every 12 minutes. Mr Ball made a Superlock four times as quickly.

(i) How many locks did Alan and Mr Ball make in 12 minutes ?

(a)(i) _____ [1]

(ii) How many Superlocks did they make altogether in 3 hours?

(a)(ii) _____ [2]

(b) In March, Alan made a Superlock every k minutes. Mr Ball worked at the same speed as in January. They made 55 Superlocks altogether in 2 hours. Calculate the value of k.

(b) _____ [2]

End of Paper 2

Mid-Year 2008 Mathematics Paper 2

Qn	Answers	Qn	Answers	Qn	Answers
1(a)	$y=\frac{20}{x+3}$	5	$y=-12$ or $y=16$	10(a)	40 litres
1(b)	$y=1\frac{7}{8}$	6	$b=\frac{11-a}{3(a+3)}$	10(b)(i)	$\$(\frac{90+x}{100})$ or $(90+x)cents$
2	196	7	$x=\frac{72}{2+\pi}$	10(b)(ii)	$(\frac{2400}{90+x})$ litres
3	$a=3, b=14, k=4$	8	$a=4, b=5$	10(c)	$x=6$
4(a)	$\frac{1}{(2y+x)}$	9(a)		11(a)(i)	5 locks
4(b)	$(a-b)(a-3b)$	9(b)	$x=16$ or $x=4$	11(a)(ii)	75 locks
4(c)	$\frac{-x^2+4x-7}{(x+1)(x-1)(x-3)}$	9(c)	$x=16$ is rejected because x should be less than 10cm which is the length of the square.	11(b)	8 minutes