Candidate Name _____ Class _____ Reg Number _____

TANJONG KATONG SECONDARY SCHOOL

Mid Year Examination 2007
Secondary Three (Express)

ADDITIONAL MATHEMATICS
Paper 1

Wednesday **2 May 2007** **1 hour**

1130 – 1230

Additional Materials:
Writing Paper

INSTRUCTION TO CANDIDATES

Write your name, class and register number in the spaces provided on the writing material.
If you use more than one sheet of paper, fasten the sheets together.
Omission of essential working will result in loss of marks.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
For π, use 3.142, unless the question requires the answer in terms of π.
You are reminded of the need for clear presentation in your answers.

INFORMATION FOR CANDIDATES

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 40.

THE USE OF AN ELECTRONIC CALCULATOR IS EXPECTED, WHERE APPROPRIATE.

This question paper consists of 2 printed pages.

Answer all the questions.

1. Given that $(x-4)$ and $(x+3)$ are factors of the expression $4x^3+hx^2-kx-84$, Calculate

   (i) the values of h and k [5]

   (ii) the remainder when the expression is divided by $2x-3$. [1]

2. Find the coordinates of intersection of the line $2x+3y=5$ and $x^2-2y^2=10-xy$. [5]

3. (a) Find the range of values of p for which $p-6 \geq p(p-4)$ [3]

   (b) Find the range of values of m for which the equation $x^2-2x=m(x-3)-6$ has 2 distinct roots. Hence, find the values of m for which the equation has equal roots. [6]

4. (a) Express the following in partial fractions.

$$\frac{3x^2-20}{x^2-4}$$ [4]

   (b) Find the values of A, B and C given

$$10x^2-3x-3 \equiv A(x^2+1)+(Bx+C)(x-1)$$

   Hence or *otherwise*, express $\dfrac{10x^2-3x-3}{(x-1)(x^2+1)}$ as partial fractions. [5]

5. (a) Given that $\dfrac{1}{1+\sqrt{3}}-\dfrac{\sqrt{3}+1}{2\sqrt{3}}=\dfrac{a\sqrt{3}+b}{3}$, find the values of a and b *without using a calculator*. [4]

   (b) Given that $q+\dfrac{1}{q}=\sqrt{17}$, find the value of $q^2+\dfrac{1}{q^2}$. [3]

6. Solve the following pair of simultaneous equations *without using a calculator*.

$$64\times 2^y=8^x$$

$$3^{4x}\div\left(\frac{1}{81}\right)^{y-1}=9$$ [4]

End Of Paper

Candidate Name _____

Class	Reg Number

TANJONG KATONG SECONDARY SCHOOL

Mid Year Examination 2007
Secondary Three (Express)

ADDITIONAL MATHEMATICS
Paper 2

Monday **7 May 2007** **1 hour 15 minutes**

0750 – 0905

Additional Materials:
Writing Paper

INSTRUCTION TO CANDIDATES

Write your name, class and register number in the spaces provided on the writing material.
If you use more than one sheet of paper, fasten the sheets together.
Omission of essential working will result in loss of marks.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
For π, use 3.142, unless the question requires the answer in terms of π.
You are reminded of the need for clear presentation in your answers.

INFORMATION FOR CANDIDATES

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.

THE USE OF AN ELECTRONIC CALCULATOR IS EXPECTED, WHERE APPROPRIATE.

This question paper consists of 2 printed pages.

Answer All Questions

1. Solve the equation

(a) $9^{x-2} + 3^3 = 54$ [2]

(b) $\log_3(3^{x+1} - 18\sqrt{3}) = x$ [4]

(c) $2\lg(x+2) - \lg x = 4\lg 3 - \lg 4$ [4]

2. Find the range of values of k for which the line $y = kx - 5$ meets the curve $y = 6x - x^2 - 6$. [5]

3. Solve the equation $x^2 = 1 + \frac{2}{x} - 2x$. [5]

4. When the expression $4x^4 + ax^3 + 10x^2 + 14$ is divided by $(x^2 - x - 2)$, the remainder is $(bx + 36)$. This result may be expressed as $4x^4 + ax^3 + 10x^2 + 14 \equiv (x^2 - x - 2)Q(x) + (bx + 36)$, where $Q(x)$ is the quotient. By substituting suitable values of x, find the value of a and of b. [5]

5. (a) If α and β are the roots of the equation $2x^2 - 4x + 13 = 0$, find the value of

$$\frac{1}{\alpha^2} + \frac{1}{\beta^2}$$ [3]

(b) The roots of the quadratic equation $x^2 - 2hx - 4x + h^2 + 3h + 2 = 0$ are non-zero. One of the roots is twice the other. Calculate the value of h. [6]

6. Given that $2^x 4^y = 128$ and that $\lg(4x - y) = \lg 2 + \lg 5$, calculate the value of x and of y. [4]

7. ***Answers by accurate drawing is not accepted.***

(a) Sketch the graph of $y = |-2x^2 + 9x + 18|$, for $0 \le x \le 7$. [4]

(b) Sketch the graph of $y = |5 - 2x| - 1$, for $0 \le x \le 4$.

Find the range of values of x for which y is $y \ge 1$ [5]

8. Evaluate

$(\log_x 27)(\log_{81} x)$. [3]

End of Paper

Answers

Q1. $h = 3 \qquad k = 55$

$$f(\frac{3}{2}) = -146\frac{1}{4}$$

Q2. (7, - 3) (4, - 1)

Q3. (a) $2 \le p \le 3$

(b) $m < -2$ or $m > 10$

$m = -2$ or $m = 10$

Q4. (a) $3 - \left(\frac{2}{x-2}\right) + \left(\frac{2}{x+2}\right)$

(b) $\frac{2}{x+1} + \frac{8x+5}{x^2+1}$

Q5. (a) $a = 1 \qquad b = -3$

(b) $q^2 + \frac{1}{q^2} = 15$

Q6. $x = 1\frac{7}{8} \qquad y = -\frac{3}{8}$

Tanjong Katong Secondary School
Mid-Year Exam 2007
Sec 3 A Math Paper 2 Answers

	Paper 2
1a	$x = 3.5$
1b	$x = 2.5$
1c	$x = 0.25$ or $x = 16$
2	$k \leq 4$ or $8 \leq k$
3	$x = 1$ or $x = -2$ or $x = -1$
4	$a = -11$ or $b = -3$
5	(a) $-\frac{36}{169}$ (b) $h = 7$ or $h = -2$
6	$x = 3$ or $y = 2$
7b	$0 \leq x \leq 1.5$, $3.5 \leq x \leq 4$
8	$\frac{3}{4}$