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TANJONG KATONG SECONDARY SCHOOL
Mid-Year Examination 2017
Secondary 1

CANDIDATE
NAME

CLASS

INDEX NUMBER

MATHEMATICS

4048/01

Paper 1

Monday 15 May 2017

1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.

Write in dark blue or black pen.

You may use an HB 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.

The use of an approved scientific calculator is expected, where appropriate.

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 of the marks for this paper is 40.

For Examiner's Use

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This document consists of **10** printed pages.

For
Examiner's
Use

Answer all the questions

For
Examiner's
Use

- 1 Express $\frac{2}{11}$ as a recurring decimal.

Answer [1]

- 2 Using all the numbers below, complete the following table.

 $3.\dot{3}, \pi, \sqrt{5}, \sqrt[3]{8}, -2.1^2$

Answer

Rational Number(s)	
Irrational Number(s)	

[2]

- 3 Given that x is an integer, when x is rounded off to 1 significant figure, the answer is 40.
Write the least possible value of x and the largest possible value of x .

Answer

Least possible value.....

Largest possible value..... [2]

For
Examiner's
Use

- 4 m and n are two prime numbers, both larger than 5.
“The sum of m and n will always be a prime number.”
Do you agree with this statement? Justify your answer.

For
Examiner's
Use

Answer

.....

.....

.....

.....

[2]

-
- 5 Mary’s household paid \$55.75 for water services in March 2017. The water charges are going to increase by 15% by July 2017. Calculate the amount, correct to the nearest cent, Mary would have to pay in July 2017 if their usage of water remains the same.

Answer \$..... [2]

For
Examiner's
Use

- 6 (a) Given that the value of $m+n=-2$, find the value of $4m+4n-3$.

For
Examiner's
Use

Answer (a)..... [1]

- (b) Given that $a=2$, $b=-1$ and $c=10$, calculate the value of $\frac{\sqrt{c-3ab}}{b}$.

Answer (b)..... [2]

For
Examiner's
Use

7

- (a) A rectangle has an area of 69.8 cm^2 and its length is 5.2 cm .
Estimate the breadth of the rectangle.

For
Examiner's
Use

Answer (a)cm [1]

- (b) Estimate the value of $\sqrt{82} \times \sqrt[3]{7}$, without using a calculator. Show your working clearly.

Answer (b) [2]

For
Examiner's
Use

- 8 Mr Sim bought 60 eggs at q cents per dozen.

For
Examiner's
Use

- (a) Express the total amount of money he paid for the eggs, in terms of q .

Answer (a).....cents [1]

- (b) He sold them for r cents each. Show that the profit he made is $5(12r - q)$ cents.

Answer :

[1]

- (c) Hence, explain what will happen if $12r - q < 0$.

Answer

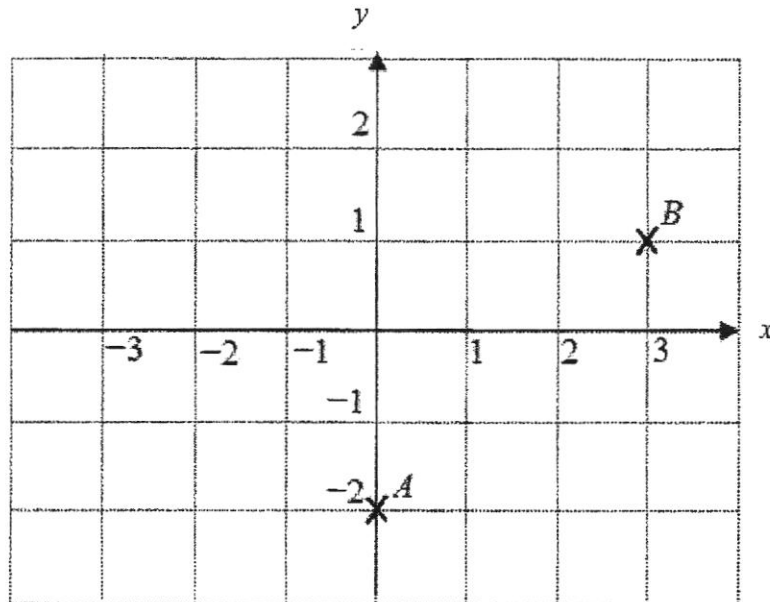
.....

.....

[1]

For
Examiner's
Use

- 9 A and B are points on the coordinate plane as shown.

For
Examiner's
Use

- (a) Write down the coordinates of point A .

Answer (a) (.....,) [1]

- (b) Find the gradient of line AB , given that $B(3, 1)$.

Answer (b) [2]

- (c) Given that $C(k, 1)$ is a point on the coordinate plane such that the area of triangle ABC is 9 units^2 , find the possible values of k .

Answer (c) $k = \dots\dots\dots$ or $\dots\dots\dots$ [2]

For
Examiner's
Use

- 10 (a) When written as the product of their prime factors,

$$360 = 2^3 \times 3^2 \times 5,$$

$$3024 = 2^4 \times 3^3 \times 7.$$

For
Examiner's
Use

- (i) Find the highest common factor of 360 and 3024.

Answer (a) (i) [2]

- (ii) Find the smallest positive integer p such that $360p$ is a perfect square.

Answer (a) (ii) [1]

- (iii) Find the smallest positive integer q for which $360q$ is a multiple of 3024.

Answer (a) (iii) [1]

- (b) When the students in a school are arranged into rows of 9, 12 or 20, there will be a student who does not fit into any row. Given that the number of students in the school does not exceed 500, find the greatest possible number of students.

Answer (a) [2]

For
Examiner's
Use

- 11** During each week, a site engineer checks the water level above the ground as required by the environment authority of a country. The table below shows the daily water level recorded for a particular week.

For
Examiner's
Use

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Water level (in mm)	+7.3	-12.0	-19.3	+11.7	-4.6

- (a) On which day was the lowest level of water recorded?

Answer (a)..... [1]

- (b) What is the largest difference in water level between any two days of the week?

Answer (b).....mm [2]

- (c) Calculate the average water level.

Answer (c).....mm [2]

For
Examiner's
Use

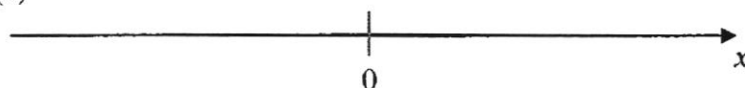
12

- (a) Solve the inequality $\frac{4x-11}{2} \leq 3x-3 < 4$.

Represent your answer on the number line given below.

For
Examiner's
Use

Answer (a)



[4]

- (b) Hence, write down

- (i) the greatest integer value of x which satisfies $\frac{4x-11}{2} \leq 3x-3 < 4$.

Answer (b) (i) [1]

- (ii) the smallest integer value of x which satisfies $\frac{4x-11}{2} \leq 3x-3 < 4$.

Answer (b) (ii) [1]

End of Paper

4048/Sec1MidYear17

[Turn over]



TANJONG KATONG SECONDARY SCHOOL
Mid-Year Examination 2017
Secondary 1

CANDIDATE
NAME

CLASS

INDEX NUMBER

MATHEMATICS

4048/02

Paper 2

5 May 2017

1 hour 15 minutes

Additional Materials: Writing Paper
Graph Paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.

Write in dark blue or black pen.

You may use an HB 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 of the marks for this paper is 50.

This document consists of 4 printed pages

[Turn over

2

- 1 (a) Write down the following numbers in order of size, starting with the smallest.

$$0.564, \quad 0.565, \quad 0.\dot{5}\dot{6}, \quad 0.\dot{5}6\dot{3} \quad [1]$$

- (b) Expand and simplify $a(a+1) - 2(2-a)$. [2]

- (c) (i) Evaluate $\frac{\sqrt[3]{249} + 41}{0.55}$.

Write down the first five digits on your calculator display. [1]

- (ii) Write down your answer to part (i) correct to 3 significant figures. [1]

- 2 There are three numbers. The second number is thrice the first number.
The third number is three less than four times the first number.

- (a) Given that the first number is $2n$, write down an algebraic expression, in terms of n , for

(i) the second number,

(ii) the third number. [2]

- (b) If the sum of the three numbers is 77, form an equation in n . [1]

- (c) Solve the equation in part (b) and find the third number. [3]

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

The table below shows some values of x and the corresponding values of y .

x	-3	0	3
y	5	1	-3

- (a) Using a scale of 2 cm to represent 1 unit on each axis, draw a horizontal x -axis for $-3 \leq x \leq 3$ and a vertical y -axis for $-3 \leq y \leq 5$. [3]
On your axes, plot the points given in the table and join them with a straight line.

- (b) Use your graph to find the value of x when $y = 3$. [1]

3

- 4 (a) Solve the inequality $15 - 3x < -x - 16$.
Hence, find the smallest prime number, x , such that $15 - 3x < -x - 16$. [3]
- (b) It is given that $-3 \leq x \leq 1$ and $-5 \leq y \leq 2$, calculate
(i) the smallest possible value of $x - y$, [1]
(ii) the greatest possible value of $x^2 + y^2$. [1]
- (c) Given that $x = 6$ is the solution to the equation $2kx - 7 = x + 11$, find the value of k . [2]
- 5 (a) (i) Factorise completely $4x^2 - 4xy - py + px$. [3]
(ii) Factorise $b^2 + b$. Explain why if b is a positive integer, then $b^2 + b$ is always even. [2]
- (b) A stamp collector will suffer a loss of 35% if he sells a particular stamp for \$273.
(i) Find the price he paid for it. [2]
(ii) What would the selling price be if he wants to make a profit of 15%? [2]
- 6 (a) Solve the following equations.
(i) $2(x - 3) - 5x = -3$ [3]
(ii) $\frac{2}{y+5} = \frac{3}{4y-1}$ [3]
- (b) (i) Simplify $\frac{\sqrt{64p^2}}{4} \div \frac{10}{p^2}$. [3]
(ii) Express $\frac{y-2}{3} - \frac{y+3}{2}$ as a single fraction in its simplest form. [3]

- 7 Jasmine and her family plan to visit the Singapore Zoological Gardens by bus from Yishun. To travel to the zoo by bus, the family needs to take Bus 171 from bus stop X near their house. Then, they will need to alight at bus stop Y to take Bus 927 to the zoo.

(a) The distance from bus stop X to bus stop Y is 12 km.

- (i) If Bus 171 travelled at an average speed of 40 km/h, calculate the time taken to travel from bus stop X to bus stop Y . [1]

The distance from bus stop Y to the zoo is 6 km.

- (ii) Find the time taken to travel from bus stop Y to the zoo if Bus 927 travelled at an average speed of 30 km/h. [1]

Hence, find the total time taken to travel from bus stop X to the zoo, leaving your answer in minutes. [1]

State an assumption that you have made in your calculation. [1]

Table 1 below shows information on Bus 927 from Choa Chu Kang Bus Interchange:

Period	0630 - 0830	0831 - 1659	1700 - 1900	After 1900
Estimated waiting time	13 – 14 minutes	13 – 18 minutes	13 – 18 minutes	13 – 18 minutes

- (b) The family boards Bus 171 from bus stop X at 0930.

When they reach bus stop Y , Bus 927 has just left.

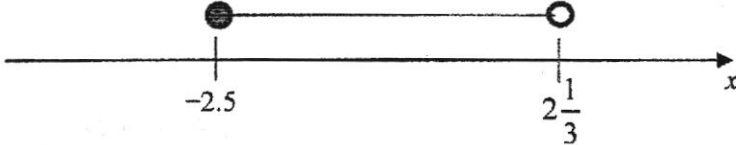
Using your answer in part (a) and **Table 1**, do you think they will definitely be able to reach the zoo by 1015? Show your working clearly. [3]

End of Paper

Sec 1 Mathematics Mid Year Examination 2017 Marking Scheme

1	$0.\dot{1}\dot{8}$		B1
2	Rational Numbers	$3.\dot{3}, \sqrt[3]{8}, -2.1^2$	B2 (minus 1 mark for each mistake, up to 2 mistakes)
	Irrational Numbers	$\pi, \sqrt{5}$	
3	Least: 35 Largest: 44		B1 B1
4	No. If $m = 9$ and $n = 7$, $m + n = 16$. 16 is not a prime number.		B1 – use of specific eg. B1 – correct conclusion
5	$\frac{115}{100} \times 55.75 = 64.11$		M1 – calculate 15% or 115% A1
6a	-11		B1
6b	$\frac{\sqrt{c-3ab}}{b}$ $= \frac{\sqrt{10-3(2)(-1)}}{-1}$ $= -4$		M1 – substitution A1
7a	14		B1 C.A.O
7b	$\sqrt{82} \times \sqrt[3]{7}$ $= \sqrt{81} \times \sqrt[3]{8}$ $= 9 \times 2$ $= 18$		M1 estimate $82 \approx 81$ or $7 \approx 8$. A1 (do not accept 17)
8a	$5q$		B1
8b	$60r - 5q = 5(12r - q)$		B1 – $60r - 5q$
8c	Mr Sim will make a loss if $12r - q < 0$ (or $12r < q$)		B1 o.e (accept negative profit, Mr Sim will lose money)
9a	$(0, -2)$		B1
9b	$m = \frac{3}{3}$ $= 1$		M1 rise/run or change in y / change in x (nfww) A1
9c	-3 or 9		B2
10ai	$2^3 \times 3^2 = 72$		M1 (any method, 2 and 3 seen as common factors) A1
10 aii	10		B1
10a	42		B1

Sec 1 Mathematics Mid Year Examination 2017 Marking Scheme

iii		
10b	LCM = 180 No. of students = 361	M1 – finding LCM A1
11a	Wednesday	B1
11b	$11.7 - (-19.3) = 31$	M1 – largest minus smallest value or smallest minus largest A1
11c	$\frac{7.3 - 12.0 - 19.3 + 11.7 - 4.6}{5} = -3.38$	M1 – calculating average (sum/5) A1
12a	$\frac{4x-11}{2} \leq 3x-3 < 4$ $\frac{4x-11}{2} \leq 3x-3 \quad \text{and} \quad 3x-3 < 4$ $x \geq -2.5 \quad \text{and} \quad x < 2\frac{1}{3}$ $-2.5 \leq x < 2\frac{1}{3}$ 	M1 Split M1 Solving inequality by moving x to one side (either inequality) A1 (if improper, A0) B1
12bi	2	√B1
12b ii	-2	√B1

Secondary One Mathematics

Mid-Year Examination 2017

Paper 2 Marking Scheme

Deduct maximum of 1 mark overall for no statement/ units

Statement to be stated for Question 2(c) / 5(b) (i) & (ii) / 7(a) (i) (ii) and (b)

	Solution	Marks	Remarks
1(a)	$0.\dot{5}6\dot{3}$, 0.564, 0.565, $0.5\dot{6}$	B1	
1(b)	$a(a+1)-2(2-a)$ $=a^2+a-4+2a$ $=a^2+3a-4$	B1 B1	Either a^2+a or $-4+2a$ seen
1(c)(i)	85.983	B1	
1(c)(ii)	86.0	B1√	
			5 marks
2(a) (i)	$6n$ or $3(2n)$	B1	
2(a)(ii)	$8n-3$ or $4(2n)-3$	B1	
2(b)	$2n+6n+(8n-3)=77$	B1√	$2n+(a)(i)+(a)(ii)=77$ seen
2 (c)	$16n=80$ $n=5$ Third number = 37	M1 A1 B1	simplifying variable on one side
			6 marks
3 (a)	Axes correctly drawn and labeled correct scale used Correct plotting of points Joining of points with a line	B1 B1 B1	B0 for missing pts or any 1 pt plotted wrong
3 (b)	$x = -1.5$ or 1.50	B1	
			4 marks
4(a)	$15-3x < -x-16$ $2x > 31$ $x > 15.5$ Smallest prime number = 17	M1 A1 B1√	Grouping of variable or constant A0 for $\frac{31}{2}$ Must see $x > \text{constant}$
4(b)(i)	$-3-2=-5$	B1	
4(b)(ii)	$(-3)^2+(-5)^2=34$	B1	
4(c)	$12k-7=17$ $12k=24$ $k=2$	M1 A1	Substituting of value to solve for k
			7 marks

5(a)(i)	$4x^2 - 4xy - py + px$ $= 4x(x - y) - p(y - x)$ $= 4x(x - y) + p(x - y)$ $= (4x + p)(x - y)$	M1 B1 A1	Either $4x(x - y)$ or $p(y - x)$ or $p(x - y)$ seen (SOI)
5(a)(ii)	$b^2 + b = b(b + 1)$ b and $b + 1$ are consecutive integers, thus one of them must be even. The product of an even integer with another integer is always even. / Odd / Even integer multiply by another integer will always be even.	B1 B1	Product and even seen
5 (b) (i)	$\text{Price} = \frac{273}{65} \times 100$ $= \$420$	M1 A1	o.e.
5 (b) (ii)	$\text{Selling Price} = \frac{115}{100} \times 420$ $= \$483$	M1 ✓ A1	115% x (b)(i)
			9 marks
6 (a) (i)	$2(x - 3) - 5x = -3$ $2x - 6 - 5x = -3$ $-3x = 3$ $x = -1$	B1 M1 A1	Correct Expansion for $2(x - 3)$ Grouping of variable/constant A0 for $\frac{3}{-3}$
6 (a)(ii)	$\frac{2}{y+5} = \frac{3}{4y-1}$ $2(4y-1) = 3(y+5)$ $8y-2 = 3y+15$ $5y = 17$ $y = 3\frac{2}{5}$	M1 M1 A1	Remove denominator Group constant / variable A0 for $\frac{17}{5}$
6(b)(i)	$\frac{\sqrt{64p^2}}{4} \div \frac{10}{p^2}$ $= \frac{8p}{4} \times \frac{p^2}{10}$ $= \frac{p^3}{5} / \frac{1}{5} p^3$	B1 M1 A1	For $8p$ x $\frac{p^2}{10}$ seen

6(b)(ii)	$\frac{2(y-2)}{3} - \frac{y+3}{2}$ $= \frac{2y-4-3(y+3)}{6}$ $= \frac{2y-4-3y-9}{6}$ $= \frac{-y-13}{6} \text{ or } \frac{-(y+13)}{6}$	M1 B1 A1	Express as a single fraction with common denominator For correct expansion of $-3y-9$ ISW
			12 marks
7(a)(i)	Time taken from Bus Stop X to Bus Stop Y = $\frac{12}{40}$ h $= \frac{3}{10}$ h or 18 min	B1	
7(a)(ii)	Time taken from Bus Stop Y to the zoo = $\frac{1}{5}$ h or 12 min Total time taken from Bus Stop X to the zoo = 18 min + 12 min = 30 min Assumption: No waiting time required during transfer of buses	B1 B1 B1	B0 if answer given in hour
7(b)	Max waiting time needed for Bus 927 + Total travel time = 30 + 18 = 48 minutes If they need to be at the zoo by 1015, total time needed should not be more than 45 minutes. No, they cannot.	B1 B1 B1	Indicated the maximum waiting time for Bus 927 Calculating total time needed to reach zoo/ Award 1 mark if student use minimum waiting time (i.e. 13 + 30 = 43 minutes) Conclusion with working shown
			7 marks

B1 45 mins seen

B1 45mins + waiting time > 1015

B1 Conclusion indicating that the time reached will be > 1015

B1 45 mins seen

B1 30 mins + (16, 17, 18) mins or (a) (ii) + 18 mins > 45 mins

B1 Conclusion indicating time taken > 45 mins

B1 45 mins seen

B1 (a)(ii) (28mins or more) + 18 mins > 45 mins seen

B1 B1 Conclusion indicating time taken > 45 mins

B1 45 mins seen

B1 (a)(ii) (26mins or less) + 18 mins < 45 mins seen

B1 B1 Conclusion indicating total time taken < 45 mins – cannot reached