

Name : _____

Register Number : _____

Class : _____

Clementi Town Secondary School
Mid-Year Examination 2017
Secondary 2 Express



MATHEMATICS
Paper 1

3 May 2017
1 hour

Candidates answer on the Question Paper.

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READ THESE INSTRUCTIONS FIRST

Do not open the booklet until you are told to do so.

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

Write in dark blue or black pen.

You may use a n 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.

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.

CALCULATORS ARE NOT ALLOWED TO BE USED IN THIS PAPER.

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**.

FOR EXAMINER'S USE
50

This question paper consists of **11** printed pages, including the cover page.

[Turn over

Answer all the questions in the spaces provided.

1. (a) Expand and simplify $(3x - 2y)^2$.

Answer (a) [1]

- (b) Using your answer to part (a), find the value of 28^2 .

Answer (b) [2]

2. Factorise the following completely

(a) $x^2 + 2x - 35$,

Answer (a) [1]

(b) $9x^2 - 25$,

Answer (b) [1]

(c) $24xy - 81x^2y$.

Answer (c) [1]

[Turn over

3. Simplify the following

(a) $\frac{45x^2y^3}{27pq} \times \frac{3p^2q^3}{9xy^2z}$

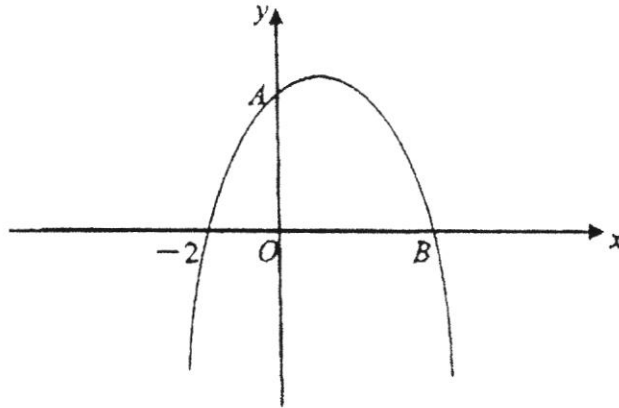
Answer (a) [1]

(b) $\frac{7r^3s}{3y^2z^3} \div \frac{14r^2s^3}{6yz^3}$

Answer (b) [2]

[Turn over

4. The curve $y = 8 + 2x - x^2$ cuts the y -axis at A and the x -axis at B as shown in the diagram.



- (a) Find the coordinates of A .

Answer (a) $A(\dots\dots\dots, \dots\dots\dots)$ [1]

- (b) Find the coordinates of B .

Answer (b) $B(\dots\dots\dots, \dots\dots\dots)$ [1]

- (c) Write down the equation of the line of symmetry.

Answer (c) $\dots\dots\dots$ [1]

- (d) Given that the point $C(2, p)$ lies on the curve, find the value of p .

Answer (d) $p = \dots\dots\dots$ [1]

[Turn over

5. In a two-digit number, the tens digit is 5 more than the ones digit.
The number is 58 greater than the product of the digits.
Find the number.

Answer [4]

6. Given that 3 is one of the roots of the equation $3x^2 + ax - 30 = 0$, find
(a) the value of a ,

Answer (a) $a =$ [2]

- (b) the value of the other root of the equation $3x^2 + ax - 30 = 0$.

Answer (b) [2]

[Turn over

7. Given that $x + y = -1$ and $xy = -12$, find the value of

(a) $(x + 1)(y + 1)$,

Answer (a) [2]

(b) $x^2 + y^2$.

Answer (b) [2]

[Turn over

8. (a) Given that $\frac{x}{b} + \frac{y}{a} = 1$, express y in terms of x , a and b .

Answer (a) $y = \dots\dots\dots$ [2]

- (b) Given that $D = b^2 - 4ac$, express b in terms of D , a and c .

Answer (b) $b = \dots\dots\dots$ [2]

[Turn over

9. Solve the following equations.

(a) $\frac{3}{x+7} = \frac{6}{x}$

Answer (a) $x = \dots\dots\dots$ [2]

(b) $(2x+1)(x-3) = 9$.

Answer (b) $x = \dots\dots\dots$ of $\dots\dots\dots$ [3]

[Turn over

10. Expand and simplify

(a) $(3x + y)(2x + 5y)$,

Answer (a) [2]

(b) $(3x + 2)^2 - (2x - 2)^2$.

Answer (b) [3]

[Turn over

11. Simplify

(a) $\frac{x-5}{x^2-7x+10}$

Answer (a) [2]

(b) $\frac{12x^2+8xy}{6xy+4y^2}$

Answer (b) [3]

[Turn over

12. The price (p), in cents, of paper is directly proportional to the mass (m) of the paper, in grams. The paper cost 50 cents when the mass is 200 g.
Find

(a) an equation connecting p and m ,

Answer (a) [2]

(b) the mass of paper, in grams, which cost 200 cents,

Answer (b) g [2]

(c) the cost of paper, in cents, with a mass of 300 g.

Answer (c)cents [2]

~ END OF PAPER ~

Name : _____

Register Number : _____

Class : _____

Clementi Town Secondary School
Mid-Year Examination 2017
Secondary 2 Express



MATHEMATICS
Paper 2

5 May 2017
1 hour 30 minutes

Additional Materials provided: Writing Papers and Graph Paper

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READ THESE INSTRUCTIONS FIRST

Do not open the booklet until you are told to do so.
Write your name, register number and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a n-HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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 number of marks for this paper is 50.

This question paper consists of 5 printed pages, including this cover page.

[Turn over

Answer *all* questions.

1. Expand and simplify the following expressions.

(a) $(2m+1)(2m-1)$ [1]

(b) $n+(3-n)^2$ [2]

2. If $(a+b)^2 = 121$ and $a^2 + b^2 = 73$, find the value of ab . [3]
-

3. 24 men can finish a job in 7 days.
Assuming that the men work at the same rate, how many more or less men will be needed if the same job has to be completed in 6 days? [3]
-

4. Solve the equation $\sqrt{\frac{x+1}{2}} = \frac{1}{3}$.
Leave your answer as a fraction in its simplest form. [3]
-

[Turn over

5. Simplify $\frac{x^2 - x - 6}{x^2 - 49} \div \frac{x - 3}{x + 7}$. [4]

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

(a) $\frac{n+5}{2m+n} - \frac{3}{4m+2n}$ [2]

(b) $\frac{1}{x-1} + 2$ [2]

7. Given that 2 cm on a map represents 5 km on actual ground, find

(a) the scale of the map in the form 1 : r , [1]

(b) the length of a fence on the map if its actual length is 3.8 km, [2]

(c) the actual area of a lake, in km^2 , if its area on the map is 3 cm^2 . [2]

8. Simplify the algebraic fractions

(a) $\frac{3x+6}{x^2-4}$, [2]

(b) $\frac{x^2-2x+1}{x^2-3x+7}$. [3]

9. A villa has two square gardens, a rose garden and a tulip garden, of different dimensions. The rose garden has length x m, while that of the tulip garden is 2 m longer.
- (a) Write down, in terms of x , an expression for the area of the tulip garden. [1]
- (b) The total area of the two gardens is 130 m^2 .
Write down an equation in terms of x to represent the information and show that it reduces to $x^2 + 2x - 63 = 0$. [2]
- (c) Solve the equation $x^2 + 2x - 63 = 0$. [2]
- (d) Find the perimeter of the rose garden. [1]
- (e) Find the cost of fencing the rose garden if the cost of fencing is \$50 per metre. [1]

10. **Answer the whole of this question on a sheet of graph paper.**
The variables x and y are connected by the equation $y = (x-1)(x-3)$.
Some corresponding values of x and y are given in the following table.

x	0	1	2	3	4
y	3	0	-1	0	h

- (a) Calculate the value of h . [1]
- (b) Using a scale of 2 cm to represent 1 unit on both axes, draw the graph of $y = (x-1)(x-3)$ for $0 \leq x \leq 4$. [3]
- (c) Use your graph to find
- (i) the values of x when $y = 2$, [2]
- (ii) the minimum value of y . [1]
- (d) State the equation of the line of symmetry. [1]

[Turn over

11. The table below shows the rental details of three soccer fields A , B and C .

Field	Cost (\$)	Duration (h)	Remarks
A	k	2	Fixed rate
B	95	1.5	Weekend rate
	180	1.5	Weekday rate (1-for-1)
C	65	1	Fixed rate

- (a) The rental cost of field A is fixed at $\$k$ for every 2-hour slot.
If 8 boys share the cost of renting one slot of field A , each boy will have to pay $\$12.50$.
Find the cost of renting field A for 2 hours. [1]
- (b) As the cost is too high for the boys, they decided to get more boys to join in their soccer game to share the rental cost of field A .
How many more boys should join in if all of them were to pay $\$5$ each? [2]
- (c) Which field, B or C , would be a better deal for weekend rental of 3 hours?
You must show all your working clearly. [2]

END OF PAPER

2E MYE P1 MARKING SCHEME 2017

1a	$9x^2 - 12xy + 4y^2$
b	784
2a	$(x+7)(x-5)$
b	$(3x-5)(3x+5)$
c	$3xy(8-27x)$
3a	$\frac{5xypq^2}{9z}$
b	$\frac{r}{s^2yz^2}$
4a	A(0,8)
b	B(4,0)
c	$x = 1$
d	$P = 8$
5	The number is 94 or 72
6a	$a = 1$
b	$x = \frac{-10}{3} = -3\frac{1}{3}$
7a	-12
b	$x^2 + y^2 = 25$
8a	$y = \frac{ab - xa}{b}$
b	$b = \pm\sqrt{D + 4ac}$
9a	$x = -14$
(b)	$x = 4 \quad x = -1.5$
10a	$6x^2 + 17xy + 5y^2$
b	$5x^2 + 20x$
11a	$\frac{1}{(x-2)}$
9b	$\frac{2x}{y}$
12a	$k=0.25$ $p = 0.25m$
b	$200=0.25m$ $m=800$
c	$P=75$

Clementi Town Secondary School
 Mid-Year Examination 2017
 Secondary 2 Express
 Math Paper 2
Answers



Question	Answers
1a	$4m^2 - 1$
1b	$9 - 5n + n^2$
2	$ab = 24$
3	4 more men
4	$x = -\frac{7}{9}$
5	$\frac{x+2}{x-7}$
6a	$\frac{2n+7}{2(2m+n)}$
6b	$\frac{2x-1}{x-1}$
7a	1:250000
7b	1.52cm
7c	$3\text{cm}^2 : 18.75\text{km}^2$
8a	$\frac{3}{x-2}$
8b	$\frac{x-1}{x-7}$
9a	$(x+2)^2 \text{ m}^2$
9c	$x = 7$ or -9
9d	28 m
9e	\$1400
10	On graph paper
11a	\$100
11b	12 more boys
11c	Field B is a better deal as it offers a cheaper rental rate.