

Name : _____

Index Number : _____

Class : _____

Clementi Town Secondary School
Mid-Year Examination 2008
Secondary 2 Express



Mathematics

Paper 1

Duration : 1 hour

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Instructions to candidates :

1. Answer **ALL** questions.
2. Your answers should be written in the spaces provided.
3. The intended marks for questions or parts of questions are given in brackets [].
4. The total marks for this paper is **50**.
5. If working is needed for any question, it must be shown clearly.

Omission of essential working will result in loss of marks.

CALCULATORS ARE NOT ALLOWED TO BE USED IN THIS PAPER.

| |
|--------------------|
| FOR EXAMINER'S USE |
| /50 |

Answer *all* the questions in the spaces provided.

1. Given that $p=3$, $q=-2$ and $r=0$, calculate the value of

(a) $2p-3q+5r$

Ans : _____ [2]

(b) $(2q-p)^2$

Ans : _____ [2]

2. Solve the equation

$$\frac{x}{x-1} + \frac{2}{5} = \frac{3}{2}$$

Ans : _____ [2]

3. Expand and simplify the following:

(a) $(5x - 4)^2$

Ans : _____ [1]

(b) $(x - 2y)(2x + y) + (3x + y)(5x - 4y)$

Ans : _____ [2]

4. Factorise completely:

(a) $32a^2 - 2b^2$

Ans : _____ [2]

(b) $2pq^2 - 4px^2 + qy^2 - 2xy^2$

Ans : _____ [2] Ω

5. Using the special algebraic rules, calculate the following:

(a) 405×395

Ans : _____ [2]

(b) $299^2 + 598 + 1$

Ans : _____ [2]

6. Simplify and express as a fraction in its simplest form:

$$\frac{6uv}{9v^3} \div \frac{8u^3v^2}{27u} \div \frac{3v}{16u^2}$$

Ans : _____ [2]

7. Simplify and express as a fraction in its simplest form:

$$\frac{a^2 - 3ab - 10b^2}{3a - 15b}$$

Ans : _____ [3]

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

(a) $\frac{x}{2} - \frac{y}{3}$

Ans : _____ [1]

(b) $\frac{a+b}{2x} + \frac{2a-b}{3x}$

Ans : _____ [2]

9. Express $\frac{3a}{5x-3} - \frac{a}{6-10x}$ as a single fraction in its simplest form.

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Ans : _____ [3]

10. Given that $rs + 2 = 3p + 4qs$:

(a) Find the value of p when $q = \frac{1}{4}$, $r = 2$ and $s = 7$

Ans : _____ [2]

(b) Express s in terms of p , q and r .

Ans : _____ [2]

11. If $v = u + \frac{1}{2}at^2$, express a in terms of v , u and t .

Ans : _____ [2]

12. Solve the following equations:

(a) $8x^2 - 2x - 15 = 0$

Ans : _____ [2]

(b) $(x - 2)(x + 4) = 27$

Ans : _____ [2]

13. Solve the following equation:

$$\sqrt{2 - x} = 2 - 3x$$

Ans : _____ [3]

14. Solve the simultaneous equations using the substitution method.

$$y = 2x$$

$$2x - 3y = 8$$

Ans : $x = \underline{\hspace{2cm}}$ $y = \underline{\hspace{2cm}}$ [3]

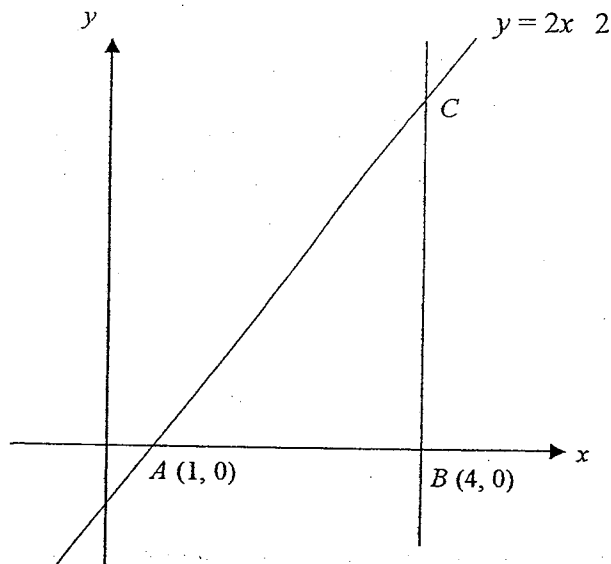
15. Solve the simultaneous equations:

$$3x + 4y = 5$$

$$2x - 3y = 9$$

Ans : $x = \underline{\hspace{2cm}}$ $y = \underline{\hspace{2cm}}$ [3]

16. In the diagram, A is the point $(1, 0)$ and B is the point $(4, 0)$. The sloping line through A and the vertical line through B meet at the point C .



(a) Write down the equation of the line BC .

Ans : $\underline{\hspace{2cm}}$ [1]

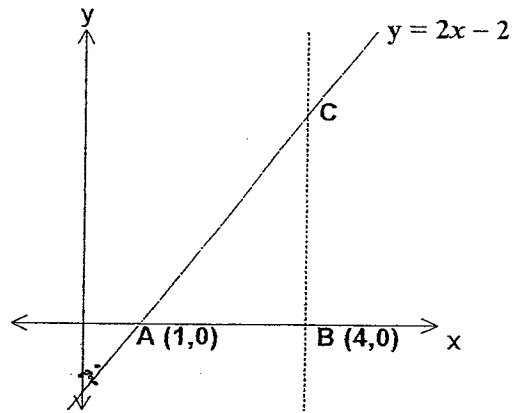
(b) Given that the equation of the line AC is $y = 2x - 2$, find the coordinates of C .

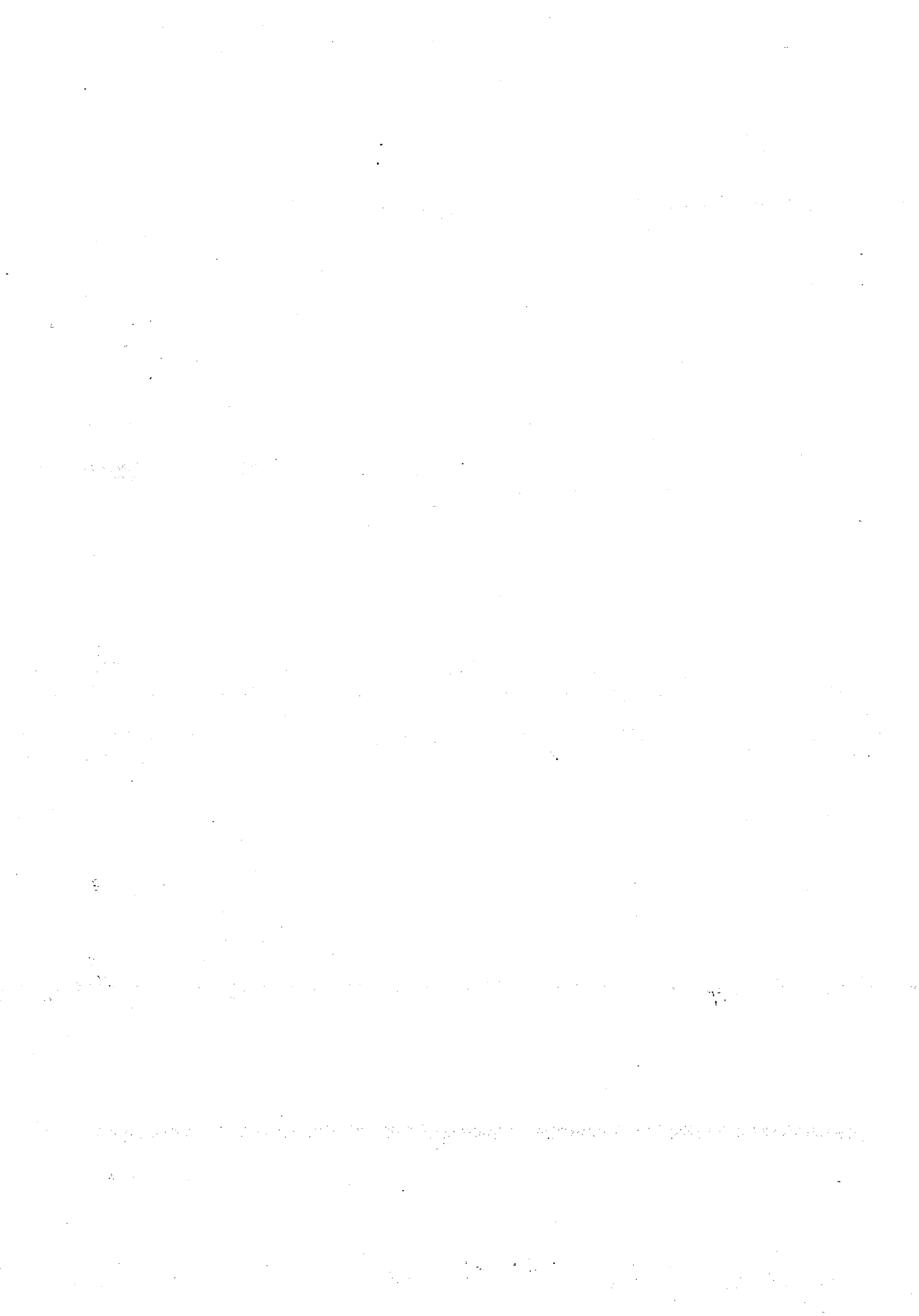
Ans : $\underline{\hspace{2cm}}$ [1]

(c) Hence, calculate the area of triangle ABC .

Ans : _____ [1]

END OF PAPER





Clementi Town Sec School
 Sec 2 Express
 Mid- Year Exam 2008
 Maths Paper 1 Answers

| Question Number | Answer | Marks |
|-----------------|-----------------------------|-------|
| 1a | 12 | 2 |
| 1b | 49 | 2 |
| | | |
| 2 | $x = 11$ | 2 |
| | | |
| 3a | $25x^2 - 40x + 16$ | 1 |
| 3b | $17x^2 - 10xy - 6y^2$ | 2 |
| | | |
| 4a | $2(4a + b)((4a - b)$ | 2 |
| 4b | $(2p + y)(q - 2x)$ | 2 |
| | | |
| 5a | 159 975 | 2 |
| 5b | 90 000 | 2 |
| | | |
| 6 | $\frac{12u}{v^5}$ | 2 |
| | | |
| 7 | $\frac{a + 2b}{3}$ | 3 |
| | | |
| | | |
| 8a | $\frac{3x - 2y}{6}$ | 1 |
| 8b | $\frac{7a + b}{6x}$ | 3 |
| | | |
| 9 | $\frac{7a}{2(5x - 3)}$ | 3 |
| | | |
| 10a | $p = 3$ | |
| 10b | $s = \frac{3p - 2}{r - 4q}$ | 2 |
| | | |

| | | |
|-----|---|---|
| 11 | $a = \frac{2(v-u)}{t^2}$ | 2 |
| 12a | $x = -1\frac{1}{4}$ or $x = 1\frac{1}{2}$ | 2 |
| 12b | $x = -7$ or $x = 5$ | 2 |
| 13 | $x = \frac{2}{9}$ or $x = 1$ | 3 |
| 14 | $x = -2$, $y = -4$ | 3 |
| 15 | $x = 3$, $y = -1$ | 3 |
| 16a | $x = 4$ | 1 |
| 16b | $(4, 6)$ | 1 |
| 16c | 9 square units | 1 |

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Clementi Town Secondary School
Mid Year Examination 2008
Secondary 2 Express



Mathematics

Paper 2

Duration : 1 hour 30 min

Additional Materials provided : Writing papers and Graph Papers

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Instructions to candidates:

1. Answer **ALL** questions.
2. Your answers should be written on the writing papers provided.
3. The intended marks for questions or parts of questions are given in brackets [].
4. The total marks for this paper is **50**.
5. If working is needed for any question, it must be shown clearly.
6. Hand in the question papers separately from the answer sheets

Omission of essential working will result in loss of marks.

CALCULATORS MAY BE USED IN THIS PAPER.

This Question Paper consists of 3 printed pages.

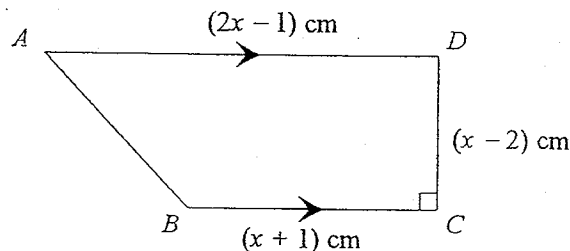
[Turn over]

Answer ALL questions

1. Expand and simplify the following
- (a) $(4-a)(4+a) - 2(a+3)^2$ [3]
- (b) Given that $x+y=7$ and $xy=-18$,
- (i) Show that $x^2+y^2=85$ [2]
- (ii) Hence or otherwise, evaluate $(x-y)^2$. [1]
2. (a) The sum of four consecutive odd numbers is 144. Form an algebraic equation to find the value of the smallest number. [3]
- (b) $x=5$ is a solution to the equation $2x^2+8x-k=0$
- (i) Find the value of k [2]
- (ii) Using the value of k found in (a), find the other solution of x . [2]
3. (a) Simplify $\frac{2x}{2-x} \times \frac{6-3x}{6} \div \frac{x+2}{4-x^2}$ [3]
- (b) Simplify the following: [3]
- $$\frac{4y-1}{x^2-9} \div \frac{4y^2+11y-3}{x^2+3x}$$
4. Express the following algebraic expression as a single fraction in its simplest form.
- (a) $\frac{4}{p+3r} - \frac{p-21r}{p^2-9r^2}$ [3]
- (b) $\frac{x+2}{x+1} - \frac{2x-3}{x-3}$ [3]
5. (a) Given that $p = 2\sqrt{\frac{4m-3p}{m+3}}$, express m in terms of p . [3]
- (b) Given that $25x^2 - 20xy + 4y^2 = 0$, find the value of $\frac{3x}{4y}$. [3]

6. The sum of the present ages of both Paul and Julie is 40. Five years ago, Paul was twice as old as Julie.
- If Paul's age is x years, write down an algebraic expression for Paul's age five years ago. [1]
 - If Julie's age is y years, write down an algebraic expression for Julie's age five years ago. [1]
 - Write down an algebraic equation to show the relationship between Paul and Julie's ages five years ago. [1]
 - Write down an algebraic equation for the sum of Paul and Julie's present ages. [1]
 - Solve the 2 simultaneous equations in (c) and (d) to find Paul and Julie's present ages. [2]

7. $ABCD$ is a trapezium in which AD is parallel to BC and $\angle BCD = 90^\circ$.



- Given that $AD = (2x - 1)$ cm, $BC = (x + 1)$ cm, $CD = (x - 2)$ cm, write down the area of the trapezium in terms of x . [2]
- If the area of the trapezium is 36 cm^2 , form an equation in x . Show that it simplifies to $3x^2 - 6x - 72 = 0$ [2]
- Hence, solve the equation in (b) and find the value of x . [2]
- Find the length of AD . [1]

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

- (a) Copy and complete the tables of values for the following graphs on the graph paper. [2]

$$3x - 4y = 10$$

| | | | |
|-----|---|---|---|
| x | 2 | 2 | 6 |
| y | | | |

$$3x + 2y = 4$$

| | | | |
|-----|---|---|---|
| x | 2 | 0 | 4 |
| y | | | |

- Using a scale of 2cm to represent 1 unit on both axes, draw the graphs of $3x - 4y = 10$ and $3x + 2y = 4$. Label each graph clearly. [3]
- Use your graph to solve the simultaneous equations $3x - 4y = 10$ and $3x + 2y = 4$. [1]

END OF PAPER

Clementi Town Sec School
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 Maths Paper 2 Answers

| Question Number | Answer | Marks |
|-----------------|--|-------|
| 1a | $-3a^2 - 12a - 2$ | 3 |
| 1b(i) | Refer to marking scheme | 2 |
| (ii) | 121 | 1 |
| 2a | 33 | 3 |
| 2b(i) | $k = 90$ | 2 |
| (ii) | $x = 9$ | 2 |
| 3a | $x(2-x)$ | 3 |
| 3b | $\frac{x}{(x-3)(y+3)}$ | 3 |
| 4a | $\frac{p}{p-3r}$ | 3 |
| 4b | $\frac{-x^2-3}{(x+1)(x-3)}$ | 3 |
| 5a | $m = \frac{3p}{4-p}$ | 3 |
| 5b | $\frac{3}{10}$ | 3 |
| 6a | $x-5$ | 1 |
| 6b | $y-5$ | 1 |
| 6c | $x-5 = 2y-10$ Or $x-5 = 2(y-5)$ Or $x-2y = -5$ | 1 |
| 6d | $x+y = 40$ | 1 |
| 6e | Paul's age is 25 and Julie's age is 15. | 2 |
| 7a | $\frac{3x^2-6x}{2}$ | 2 |
| 7b | Refer to marking scheme | 2 |

| | | | | | | | | | | | | | | | | | | |
|----|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7c | $x = 6$ | 2 | | | | | | | | | | | | | | | | |
| 7d | AD = 11 cm | 1 | | | | | | | | | | | | | | | | |
| 8a | $3x - 4y = 10$ <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>x</td><td>2</td><td>2</td><td>6</td></tr> <tr><td>y</td><td>4</td><td>1</td><td>2</td></tr> </table> $3x + 2y = 4$ <table border="1" style="display: inline-table;"> <tr><td>x</td><td>2</td><td>0</td><td>4</td></tr> <tr><td>y</td><td>5</td><td>2</td><td>4</td></tr> </table> | x | 2 | 2 | 6 | y | 4 | 1 | 2 | x | 2 | 0 | 4 | y | 5 | 2 | 4 | 2 |
| x | 2 | 2 | 6 | | | | | | | | | | | | | | | |
| y | 4 | 1 | 2 | | | | | | | | | | | | | | | |
| x | 2 | 0 | 4 | | | | | | | | | | | | | | | |
| y | 5 | 2 | 4 | | | | | | | | | | | | | | | |
| 8b | Refer to attached graph | 3 | | | | | | | | | | | | | | | | |
| 8c | $x = 2, y = 1$ | 1 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |