High School
Mathematics Test 2013

Year *Simultaneous Equations*

Non Calculator Section

Skills and Knowledge Assessed:

- Solve linear simultaneous equations, using algebraic and graphical techniques including using digital technology (ACMNA237)

Name_____

Section 1 Short Answer Section

Write all working and answers in the spaces provided on this test paper.

1. Use an algebraic method to solve simultaneously $y = 6 - 3x$ and $y = 3$.

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2. Use an algebraic method to solve simultaneously $y = 3x - 7$ and $y = x + 1$.

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3. What is the y value of the point of intersection of $3x + 2y = 8$ and $3x + 4y = 10$.

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4. Find the value of m which satisfies $m - 3n = 0$ and $2m + 3n = 18$ simultaneously.

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5. Give the value of p for which the equations $3p - q = 2$ and $2p - 2q = 8$ hold simultaneously.

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6. Find the x coordinate of the point of intersection of $y = 2x - 4$ and $3x - y = 0$.

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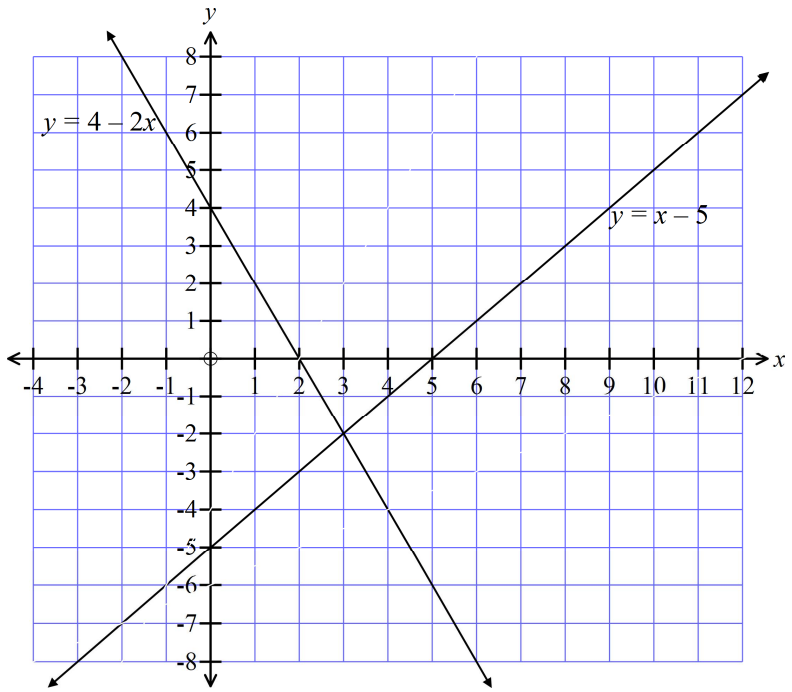
Questions 7 – 11 refer to the graph below.



7. Sketch $y = 2x - 4$ on the graph above

8. Sketch $x - 2y - 12 = 0$ on the graph above.

9. Solve simultaneously: $\begin{cases} y = 4 - 2x \\ y = x - 5 \end{cases}$

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10. Solve simultaneously: $\begin{cases} y = 2x - 4 \\ y = x - 5 \end{cases}$

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11. Solve simultaneously: $\begin{cases} x - 2y - 12 = 0 \\ y = 4 - 2x \end{cases}$

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Calculator Allowed Section

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Section 2 Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Solve simultaneously $2x + 5y = 6$ and $y = -x$.

   A. $(-5, 5)$ B. $(-2, 2)$ C. $(2, -2)$ D. $(5, -5)$

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2. Solve simultaneously $y = 7 - 5x$ and $x = 2$.

   A. $(2, -3)$ B. $(2, -2)$ C. $(2, 2)$ D. $(2, 5)$

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3. When the equations below are solved simultaneously;

$$\begin{cases} 4x + 5y = 45 \\ 8x + 5y = 65 \end{cases}$$

   A. $x = -5$ B. $x = -3$ C. $x = 3$ D. $x = 5$

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4. The solution to a pair of simultaneous equations is shown:

$3x + y = 20$ ..... ①
$5x - 2y = 26$..... ②
$6x + 2y = 40$ ..... ③ ① × 2 ..... Line 1
$x = 26$ ..... ④ ③ − ② ..... Line 2
$78 + y = 20$ Sub ④ in ① ..... Line 3
$y = -58$ ..... Line 4
Solution $(26, -58)$

   In which line does a mistake occur?

   A. Line 1 B. Line 2 C. Line 3 D. Line 4

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5. Solve simultaneously $x - 2y - 15 = 0$ and $y = 3x$.

   A. $(-5, -15)$ B. $(-4, -12)$ C. $(-3, -9)$ D. $(2, 6)$

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6. When the equations below are solved simultaneously;

$$\begin{cases} 5x + 2y = -4 \\ 9x + 4y = -6 \end{cases}$$

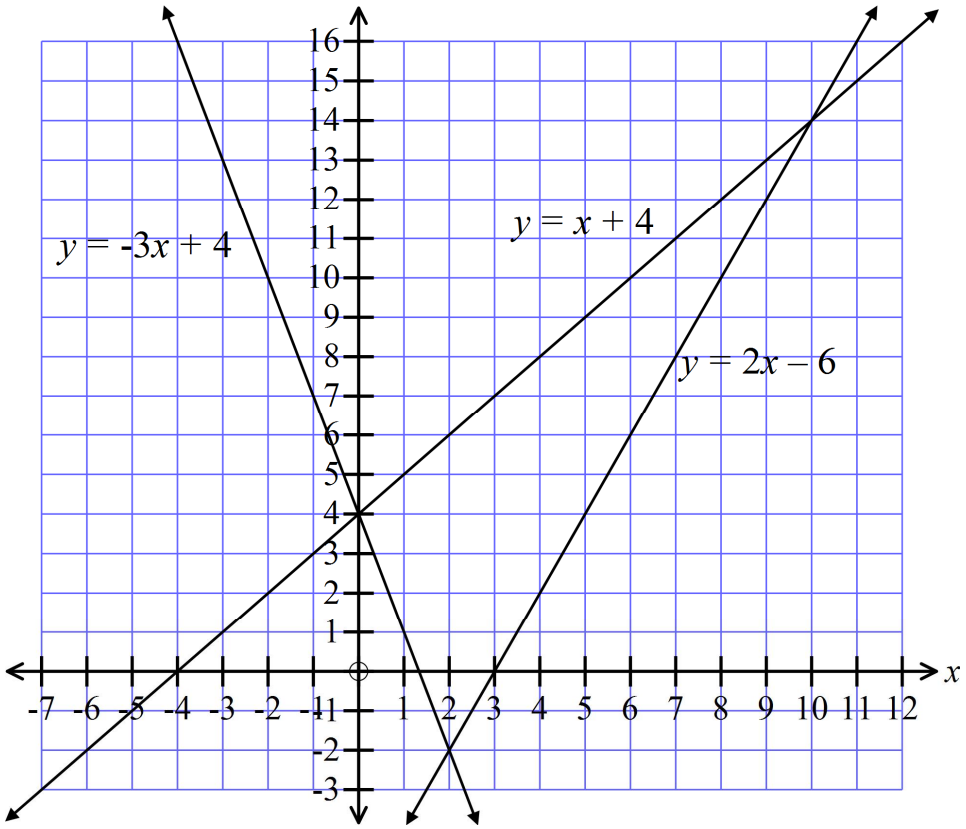
A. $x = -4$

B. $x = -3$

C. $x = -2$

D. $x = -1$

Question 7 – 9 refer to the graph below.



7. Solve

$$\begin{cases} y = -3x + 4 \\ y = x + 4 \end{cases}$$

A. (4, 0) B. (0, 0) C. (2, -2) D. (0, 4)

8. Solve

$$\begin{cases} y = -3x + 4 \\ y = 2x - 6 \end{cases}$$

A. (0, 4) B. (2, -2) C. (4, 0) D. (10, 14)

9. Solve

$$\begin{cases} y = 2x - 6 \\ y = x + 4 \end{cases}$$

A. (0, 4) B. (2, -2) C. (4, 0) D. (10, 14)

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Section 3 Longer Answer Section

Write all working and answers in the spaces provided on this test paper.

Marks

1. Solve these pairs of equations simultaneously:

a) $5p - q = 2$ and $5p + 2q = 8$. **3**

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b) $y = 2x - 4$ and $2x + y = 16$. **3**

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Marks

2. Hannah is buying furniture for a guesthouse. One day she is pays \$480 for 8 chairs and one table, and shortly afterward pays \$915 for 15 chairs and 2 tables of the same type. There had been no change in the prices of the chairs and tables. Write two equations and solve them simultaneously to find the individual price of the chairs and tables. **3**

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Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

1.	A ⬭	B ⬭	C ⬭	D ⬭
2.	A ⬭	B ⬭	C ⬭	D ⬭
3.	A ⬭	B ⬭	C ⬭	D ⬭
4.	A ⬭	B ⬭	C ⬭	D ⬭
5.	A ⬭	B ⬭	C ⬭	D ⬭
6.	A ⬭	B ⬭	C ⬭	D ⬭
7.	A ⬭	B ⬭	C ⬭	D ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭

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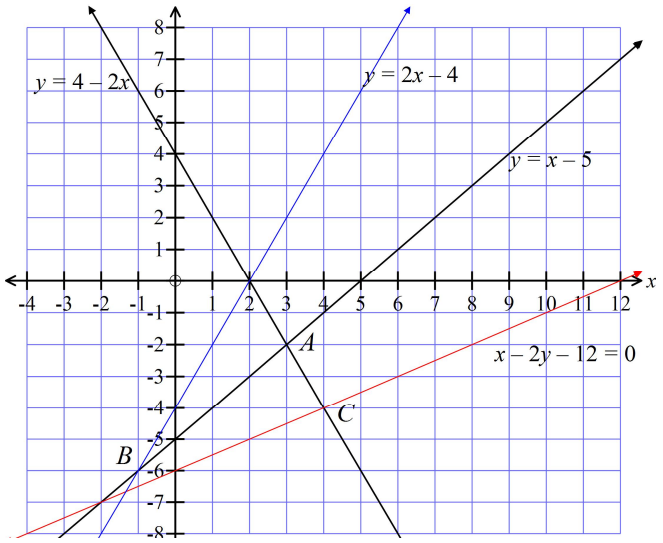
ANSWERS

Section 1	
1.	Sub $y = 3$ into $y = 6 - 3x$. $3 = 6 - 3x$ $-3 = -3x$ $x = 1$ $y = 6 - 3(1)$ $y = 3$ Solution (1, 3)
2.	Sub $y = 3x - 7$ into $y = x + 1$. $x + 1 = 3x - 7$ $2x - 7 = 1$ $2x = 8$ $x = 4$ $y = 4 + 1 = 5$ Solution (4, 5)
3.	$3x + 2y = 8$ ① $3x + 4y = 10$ ② $2y = 2$ ③ ② – ① $y = 1$
4.	$m - 3n = 0$ ① $2m + 3n = 18$ ② $3m = 18$ ③ ① + ② $m = 6$
5.	$3p - q = 2$ ① $2p - 2q = 8$ ② $6p - 2q = 4$ ③ ① × 2 $4p = -4$ ③ – ② $p = -1$
6.	Sub $y = 2x - 4$ into $3x - y = 0$. $3x - (2x - 4) = 0$ $x + 4 = 0$ $x = -4$

	
7.	*See graph*
8.	*See graph*
9.	*A* (3, -2)
10.	*B* (-1, -6)
11.	*C* (4, -4)

Section 2	
1.	B
2.	A
3.	D
4.	B
5.	C
6.	C
7.	D
8.	B
9.	D

Section 3	
1.	a) $5p - q = 2$ ① $5p + 2q = 8$ ② $3q = 6$ ③ ② – ① $q = 2$ Sub onto ① $5p - 2 = 2$ $5p = 4$ $p = \frac{4}{5}$ Solution $p = \frac{4}{5}$, $q = 2$.
	b) Sub $y = 2x - 4$ into $2x + y = 16$. $2x + (2x - 4) = 16$ $4x - 4 = 16$ $4x = 20$ $x = 5$ $y = 2(5) - 4$ $y = 6$ Solution (5, 6)
2.	$8c + t = 480$ ① $15c + 2t = 915$ ② $16c + 2t = 960$ ③ ① × 2 $c = 45$ ④ ③ – ② Sub into ① $8 \times 45 + t = 480$ $360 + t = 480$ $t = 120$ Solution $c = 45$, $t = 120$. Chairs cost \$45 and Tables cost \$120.

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Multiple Choice Answer Sheet

Name Marking Sheet

Completely fill the response oval representing the most correct answer.

1.	A ○	B ●	C ○	D ○
2.	A ●	B ○	C ○	D ○
3.	A ○	B ○	C ○	D ●
4.	A ○	B ●	C ○	D ○
5.	A ○	B ○	C ●	D ○
6.	A ○	B ○	C ●	D ○
7.	A ○	B ○	C ○	D ●
8.	A ○	B ●	C ○	D ○
9.	A ○	B ○	C ○	D ●