High School
Mathematics Test 2014

Year 10

Linear Relations

Non Calculator

Skills and Knowledge Assessed:
- Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)
- Solve problems involving parallel and perpendicular lines (ACMNA238)

Name_____

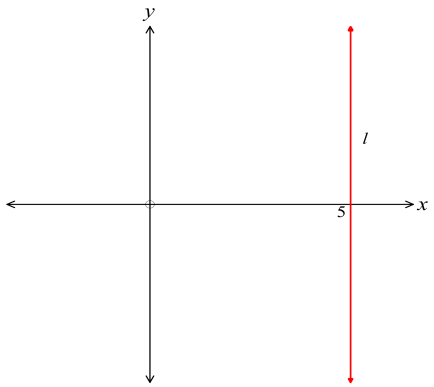
Section 1 Short Answer Section

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

1. Complete the table of ordered pairs for the equation $y = 6x - 4$.

x	1	2	3	4
y		8		20

2. The line l is shown on the number plane to the right.
The equation of the line l, is:

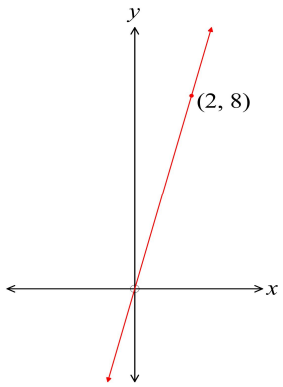


.....

.....

.....

3. What is the equation of the line shown?



.....

.....

.....

4. Does the point (2, 8) lie on the line $y = 3x + 2$? Explain your answer.

……

……

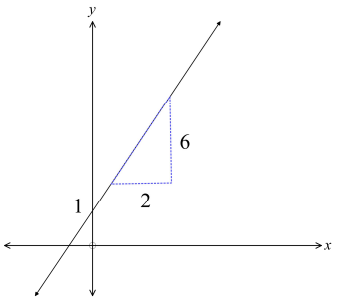
5. A line on the number plane has a gradient of 5 and crosses the y axis at $y = -3$.

What is the equation of the line?

……

……

6. What is the equation of the line shown?

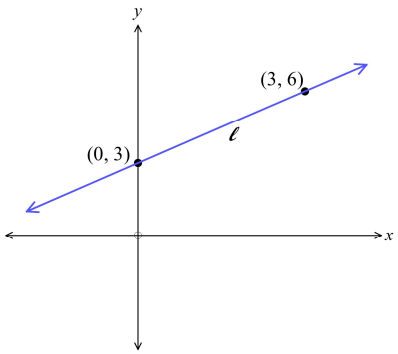


.....

.....

.....

7. The points (0, 3) and (3, 6) lie on a line ℓ.
What is the equation of the line ℓ ?



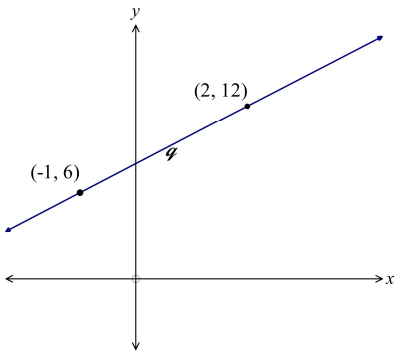
.....

.....

.....

.....

8. The points (0, 3) and (3, 6) lie on a line q.
What is the equation of the line q?



.....

.....

.....

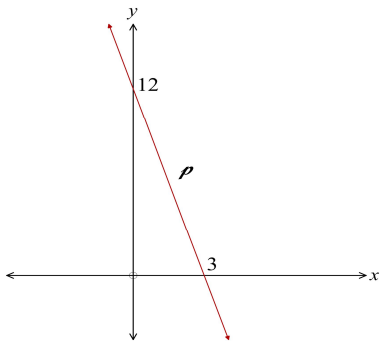
.....

9. On a number plane, the straight line p, has a gradient of 5 and passes through the point (3, 9).
What is the equation of the line?

……

……

10. The line l is shown on the number plane to the right.
The equation of the line l, is:



……

……

……

11. On a number plane, the straight line p, has a gradient of -4 and passes through the point (1, -6).
What is the equation of the line?

……

……

12. A straight line on a number plane has an equation of $5x + 3y - 15 = 0$.
What is the gradient of the line?

……

……

13. A line crosses the x axis at (-2, 0) and the y axis at (0, 6)
What is the equation of the line?

……

……

14. A line on the Cartesian plane is parallel to the line $y = 6x + 15$ and passes through the point $(2, 12)$.
What is the equation of the line?

……

……

15. The line $y = \frac{1}{2}x - 2$ and the line t are perpendicular and intersect at the point (-2, 5).
Find the equation of the line t.

……

……

High School
Mathematics Test 2014

Year 10 — *Linear Relations* — Calculator Allowed

Name_____

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. Which value is incorrect in the table for $y = 3x + 5$?

x	0	1	2	3
y	5	8	10	14

A. 5 B. 8 C. 10 D. 14

2. A line has an equation: $y = 2x - 5$.

What is its gradient?

A. -5 B. $-2\frac{1}{2}$ C. -2 D. 2

3. A line has a gradient of -4 and passes through the point $(0, -9)$ on the y axis.

What is its equation?

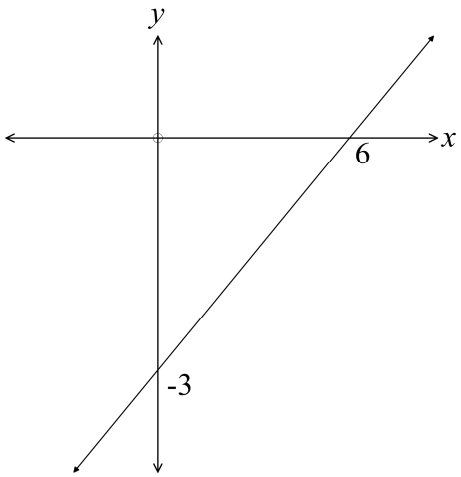
A. $y = -4 - 9x$

B. $y = -4 + 9x$

C. $y = -4x - 9$

D. $y = -4x + 9$

4. The equation of the line shown is:



A. $y = -3x - 6$

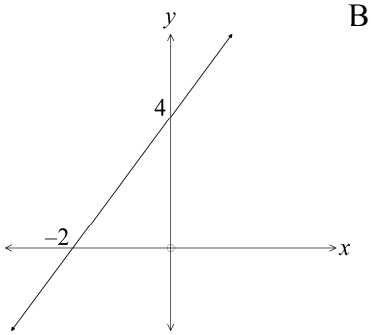
B. $y = \frac{1}{2}x - 3$

C. $y = 2x - 3$

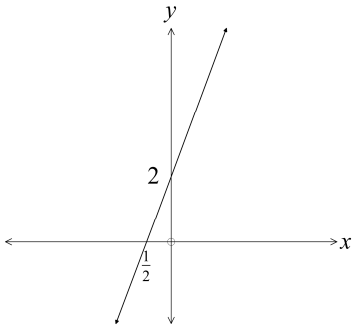
D. $y = 6x - 3$

5. Which is the graph of the line $y = 2x + 4$?

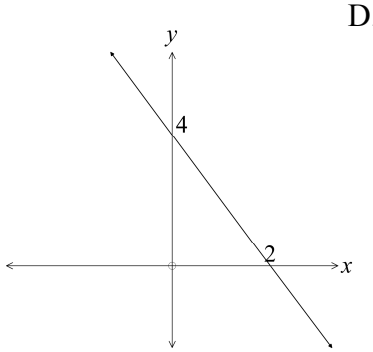
A.



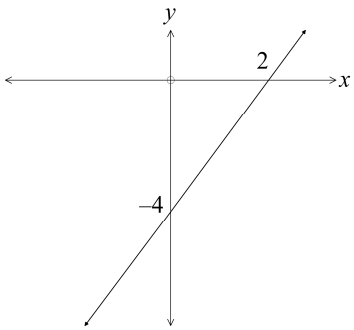
B.



C.



D.



6. A line has a gradient of 3 and passes through the point $(4, 8)$. What is its equation?

A. $y = 3 - 3x$

B. $y = 3x - 3$

C. $y = 4 - 3x$

D. $y = 3x - 4$

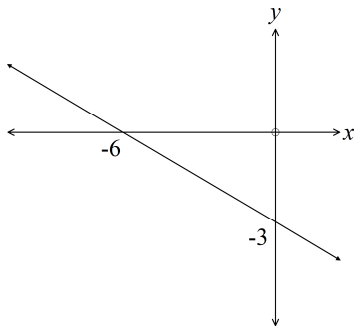
7. A line has an equation $y = -2x - 7$.

Which point lies on the line?

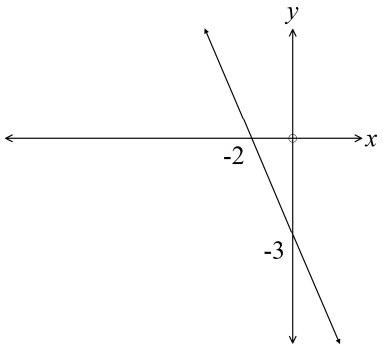
A. (-2, -7) B. (-2, -3) C. (-1, -9) D. (-1, 5)

8. Which is the graph of the line $y = \frac{1}{2}x - 3$?

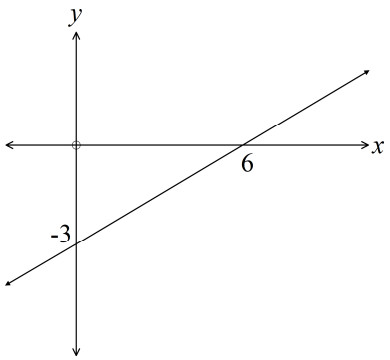
A.



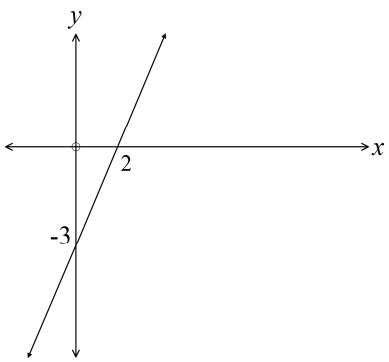
B.



C.



D.



9. A line has equation $y = -2x - 9$. Which statement is true?

A. Its gradient is -2 and its y intercept is -9.

B. Its gradient is -2 and its y intercept is 9.

C. Its gradient is 2 and its y intercept is -9.

D. Its gradient is 2 and its y intercept is 9.

10. The points $A(1, -5)$ and $B(2, -8)$ lie on a line l.

The equation of the line l, is:

A. $y = -3x - 6$ B. $y = -3x - 2$ C. $y = 3x - 6$ D. $y = 3x - 22$

11. A line has equation $2x + 3y - 9 = 0$. Which statement is true?

A. Its gradient is $-\frac{2}{3}$ and its y intercept is -3.

B. Its gradient is $-\frac{2}{3}$ and its y intercept is 3.

C. Its gradient is $\frac{2}{3}$ and its y intercept is -3.

D. Its gradient is $\frac{2}{3}$ and its y intercept is 3.

12. The points A (3, 5) and B (6, 4) lie on a line l.

The equation of the line l , is:

A. $y = -\frac{1}{3}x + 6$ B. $y = -\frac{1}{3}x - 2$ C. $y = \frac{1}{3}x - 6$ D. $y = 3x - 22$

13. Line p has equation $2x - 4y + 7 = 0$ and line q has equation $3x - 6y - 8 = 0$.
Which statement is true?

A. Line p is parallel to line q.

B. Line p is perpendicular to line q.

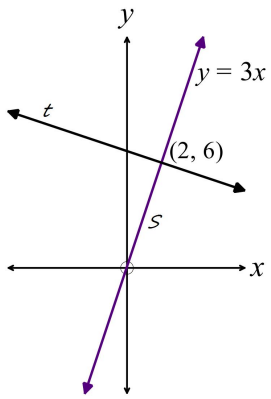
C. The lines are neither parallel nor perpendicular.

D. The lines are both parallel and perpendicular.

14. Which line is parallel to $x + 2y + 9 = 0$

A. $y = 2x - 7$ B. $y = \frac{1}{2}x - 7$ C. $y = -2x - 7$ D. $y = -\frac{1}{2}x - 7$

15. The line t is perpendicular to the line s,
which has equation $y=3x$.
The lines intersect at (2, 6)
What is the equation of the line t?



A. $x - 3y - 20 = 0$

B. $x - 3y + 20 = 0$

C. $x + 3y - 20 = 0$

D. $x + 3y + 20 = 0$

High School
Mathematics Test 2014

Linear Relations

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 ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭
11.	A ⬭	B ⬭	C ⬭	D ⬭
12.	A ⬭	B ⬭	C ⬭	D ⬭
13.	A ⬭	B ⬭	C ⬭	D ⬭
14.	A ⬭	B ⬭	C ⬭	D ⬭
15.	A ⬭	B ⬭	C ⬭	D ⬭

High School
Mathematics Test 2014

Linear Relations

ANSWERS

Section 1 (1 mark each)	
	Working and Answers
1.	<table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>**2**</td><td>8</td><td>**14**</td><td>20</td></tr></table>
2.	$x = 5$
3.	Gradient $= \frac{8}{2} = 4$ y intercept $= 0$ rquation $y = 4x$
4.	Sub (2, 8) into $y = 3x + 2$ LHS $= 8$ $RHS = 3 \times 2 + 2 = 8$ So it is on the line.
5.	gradient = 5 y intercept y = -3. $y = 5x - 3$
6.	gradient $= \frac{6}{2} = 3$ y intercept $y = 1$. $y = 3x + 1$
7.	gradient $= \frac{6-3}{3-0} = \frac{3}{3} = 1$ y intercept $y = 3$. $y = x + 3$
8.	gradient $= \frac{12-6}{2+1} = \frac{6}{3} = 2$ $y = 2x + b$ $12 = 2 \times 2 + b$ $12 = 4 + b$ $b = 12 - 4$ $b = 8$ $y = 2x + 8$

9.	gradient =5 $y = 5x + b$ $9 = 5 \times 3 + b$ $9 = 15 + b$ $b = 9 - 15$ $b = -6$ $y = 5x - 6$
10.	gradient = $\frac{-12}{3} = -4$ Y int = 12 $y = -4x + 12$
11.	gradient = -4 $y = -4x + b$ $-6 = -4 \times 1 + b$ $-6 = -4 + b$ $b = -6 + 4$ $b = -2$ $y = -4x - 2$
12.	$5x + 3y - 15 = 0$ $3y = -5x + 15$ $y = -\frac{5}{3}x + 5$ Gradient is $-\frac{5}{3}$
13.	gradient = $\frac{6}{2} = 3$ Y int = 6 $y = 3x + 6$
14.	Gradient = 6 $y = 6x + b$ $12 = 6 \times 2 + b$ $12 = 12 + b$ $b = 0$ $y = 6x$
15.	Perpendicular to the line $y = \frac{1}{2}x - 2$ so gradient = -2. $y = -2x + b$ $5 = -2 \times -2 + b$ $5 = 4 + b$ $b = 1$ $y = -2x + 1$

Section 2 (1 mark each)		
	Working	Answers
1.	$x = 2$ $y = 3 \times 2 + 5 = 11$ so 10 is incorrect.	C
2.	Gradient = 2	D
3.	Gradient = -4 and y int = -9 so $y = -4x - 9$	C
4.	gradient = $\frac{3}{6} = \frac{1}{2}$ y intercept y = -3. $y = \frac{1}{2}x - 3$	B
5.	Gradient = 2 and y int = 4 which is graph A.	A
6.	gradient = 3. $y = 3x + b$ $8 = 3 \times 4 + b$ $8 = 12 + b$ $b = 8 - 12$ $b = -4$ $y = 3x - 4$	D
7.	$y = -2(-2) - 7$ $= 4 - 7$ $= -3$ $(-2, -3)$ lies on the line.	B
8.	Gradient = $\frac{1}{2}$; y intercept = -3 Graph C	C
9.	$y = -2x + 9$. Its gradient is -2 and its y intercept is 9.	A
10.	gradient = $\frac{-8+5}{2-1} = -\frac{3}{1} = -3$ $y = mx + b$ $-8 = -3(2) + b$ $-8 = -6 + b$ $b = -2$ $y = -3x - 2$	B
11.	$2x + 3y - 9 = 0$ $3y = -2x + 9$ $y = -\frac{2}{3}x + 3$ $m = -\frac{2}{3}$ $b = 3$	B
12.	gradient = $\frac{4-5}{6-3} = -\frac{1}{3}$ $y = mx + b$ $5 = -\frac{1}{3}(3) + b$ $5 = -1 + b$ $b = 6$ $y = -\frac{1}{3}x + 6$	A

13.	$2x - 4y + 7 = 0$ $\quad 3x - 6y - 8 = 0$ $4y = 2x + 7$ $\quad 6y = 3x - 8$ $y = \frac{1}{2}x + \frac{7}{4}$ $\quad y = \frac{1}{2}x - \frac{4}{3}$ $m = \frac{1}{2}$ $\quad m = \frac{1}{2}$ Lines are parallel.	A
14.	$x + 2y + 9 = 0$ $2y = -x - 9$ $y = -\frac{1}{2}x - \frac{9}{2}$ $m = -\frac{1}{2}$ Parallel to line D	D
15.	If it is perpendicular to $y = 3x$ its gradient is $-\frac{1}{3}$. Passes through (2, 6) Equation $y = -\frac{1}{3}x + b$ $6 = -\frac{1}{3} \times 2 + b$ $6 = -\frac{2}{3} + b$ $b = 6\frac{2}{3}$ $y = -\frac{1}{3}x + 6\frac{2}{3}$ $3y = -x + 20$ $x + 3y - 20 = 0$	C

High School
Mathematics Test 2014

Linear Relations

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 ○
10.	A ○	B ●	C ○	D ○
11.	A ○	B ●	C ○	D ○
12.	A ●	B ○	C ○	D ○
13.	A ●	B ○	C ○	D ○
14.	A ○	B ○	C ○	D ●
15.	A ○	B ○	C ●	D ○