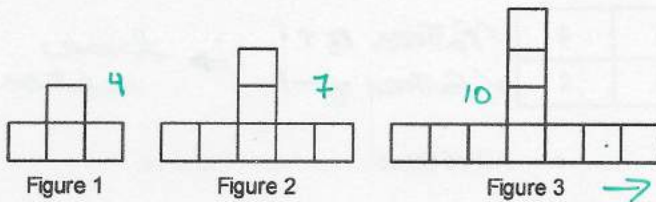


REMEMBER: A relationship is linear only when both the x and the y axis show a pattern!
 If an equation has two variables, the graph will be an oblique line
 If an equation has only one variable, the graph will be a straight line
 Always isolate one variable, and ALWAYS make a table of values

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- B 1. This pattern of unit squares continues. Which equation below relates the number of squares, n , to the figure number, f ?



$x(f)$	$y(n)$
1	4
2	7
3	10

→ Because the names are independent of the amount of squares, this is x (independent) variable

- i) $n = 3f + 4$
- ii) $n = 3f + 1$
- iii) $f = 3n + 1$
- iv) $f = 4 + 3n$

- n increases +3, then the first term is $3f$
- When $3f \rightarrow f=1$ $3(1) = 3$

a. iii

b. ii

c. iv

d. i

then

$n = 3f + 1 \rightarrow \begin{matrix} 3(1) + 1 = 4 \checkmark \\ 3(2) + 1 = 7 \checkmark \end{matrix}$

C

2. The cost to print stickers is \$6.55, plus \$0.55 per sticker. Determine an equation that relates the total cost, C dollars, to the number of stickers, s .
- a. $C = 0.55s$
 - b. $C = 6.55 + s$
 - c. $C = 6.55 + 0.55s$
 - d. $C = 7.1s$

C (dollars) in total = $\$6.55 + \$0.55 \times s$

↓
always a flat fee

price per sticker

A

3. Which tables of values represent a linear relation? (Look for constant patterns for x and y)

i)

x	1	2	3	4	5
y	4	7	12	19	28

✓ Pattern of +1
✗ not a constant pattern

ii)

x	0	1	2	3	4
y	0	5	10	15	20

✓ Pattern of +1
✓ pattern of +5 → Linear Relation

iii)

x	1	2	3	4	5
y	5	9	13	17	21

✓ Pattern of +1
✓ Pattern of +4 → Linear Relation

iv)

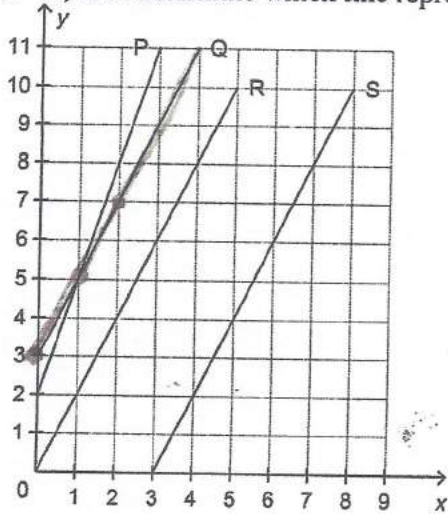
x	0	1	2	3	4
y	12	11	10	9	8

✓ Pattern of +1
✓ Pattern of -1 → Linear Relation

- a. ii, iii, and iv b. ii and iii c. All of these d. i and iv

B

4. Which graph represents the equation $y = 2x + 3$? In order to solve this, make a table of values starting at $x = 0$ to $x = 5$, then determine which line represents the values on the table.



• Make a table of values:
 $y = 2x + 3$

x	y
0	$2(0) + 3 = 3$ (0, 3)
1	$2(1) + 3 = 5$ (1, 5)
2	$2(2) + 3 = 7$ (2, 7)

The points follow in line Q

- a. Line S **b. Line Q** c. Line P d. Line R

D

5. Complete the table of values. (Substitute the variable with the value given)

$y = 9 - 5x$

x	2	4	6	8
y	-1	-11	-21	-31

$y = 9 - 5(2) = 9 - 10 = -1$
 $y = 9 - 5(4) = 9 - 20 = -11$
 $y = 9 - 5(6) = 9 - 30 = -21$
 $y = 9 - 5(8) = 9 - 40 = -31$

a.

x	2	4	6	8
y	4	-1	-6	-11

c.

x	2	4	6	8
y	4	8	12	16

b.

x	2	4	6	8
y	8	16	24	32

d.

x	2	4	6	8
y	-1	-11	-21	-31

B

6. Which table of values represents the equation $y = 11 - 4x$? (Do as above)

a.

x	-2	-1	0	1	2
y	5	6	7	8	9

c.

x	-2	-1	0	1	2
y	3	7	11	15	19

b.

x	-2	-1	0	1	2
y	19	15	11	7	3

d.

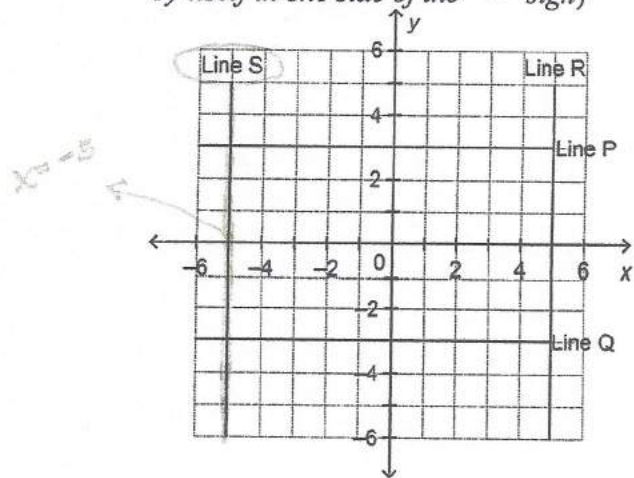
x	-2	-1	0	1	2
y	-14	-7	0	7	14

$y = 11 - 4x$

x	y
-2	$11 - 4(-2) = 11 + 8 = 19$
-1	$11 - 4(-1) = 11 + 4 = 15$
0	$11 - 4(0) = 11$
1	$11 - 4(1) = 11 - 4 = 7$
2	$11 - 4(2) = 11 - 8 = 3$

↳ Pattern of -4

- D 7. Which line is the graph of $x + 5 = 0$? (Remember: You must solve for x , or isolate x . This means x has to be by itself in one side of the "=" sign)



$x + 5 = 0$
 You must solve for x
 $x + 5 = 0 - 5$
 -5
 $x = 0 - 5$ OR $x = -5$
 There is a line that crosses the x-axis at -5

- a. Line R b. Line Q c. Line P d. Line S

- A 8. For the equation $4x - 2y = 8$, isolate or solve for y using algebra, and then choose the correct table of values for $x = -2, 0,$ and 2 .

a.

x	-2	0	2
y	-8	-4	0

c.

x	-2	0	2
y	8	4	1

b.

x	-2	0	2
y	-8	0	1

d.

x	-2	0	2
y	0	-4	8

$4x - 2y = 8 \rightarrow$ both variables are on the same side

BUT,

we must solve for y . this means that we must re-arrange the equation so that y is isolated \rightarrow it ends on one side of the equation

• it must have a coefficient of 1

$4x - 2y = 8 - 4x$
 $-4x$

$\frac{-2y}{-2} = \frac{8 - 4x}{-2} \Rightarrow y = \frac{8 - 4x}{-2}$ simplified is $y = -4 + 2x$

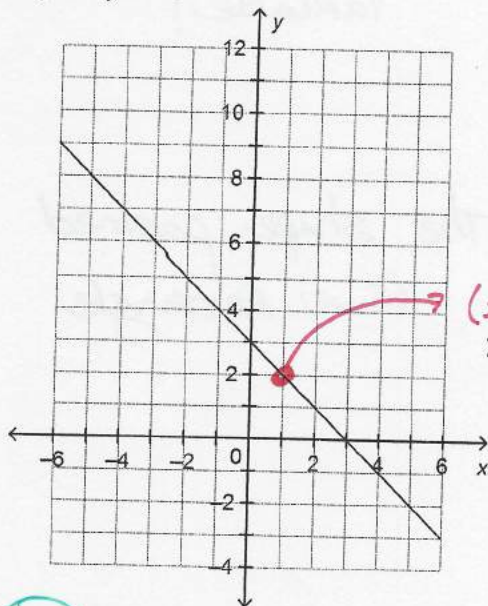
• Make a table of value

x	y
-2	$-4 + 2(-2) = -8$
0	$-4 + 2(0) = -4$
2	$-4 + 2(2) = 0$

\rightarrow Increases by 4

- A** 9. Which equation describes the graph? (For each equation, you must isolate a variable, and then make a table of values)

- i) $x + y = 3$
 ii) $x - y = 3$
 iii) $y - x = 3$
 iv) $x + y = -3$

a. i

b. ii

c. iii

d. iv

• the easiest way to approach this is to come up with an ordered pair found on the graph, and use the x and y values to choose which equation is correct.

- i) $x + y = 3 \Rightarrow 1 + 2 = 3 \checkmark$
 ii) $x - y = 3 \Rightarrow 1 - 2 \neq 3 \times$
 iii) $y - x = 3 \Rightarrow 2 - 1 \neq 3 \times$
 iv) $x + y = -3 \Rightarrow 1 + 2 \neq -3 \times$

Short Answer

10. In the equation $R = 6(w - 1) + 4$, determine the value of R when $w = 13$.

 $\Rightarrow 76$

11. In a table of values for a pattern, $P = 17$ when $n = 2$. Which equation might represent the pattern?

- i) $P = 17n$
 ii) $P = 9n$
 iii) $P = 6n + 5$
 iv) $P = 17n - 9$

⑩ $R = 6(w - 1) + 4$, $R = ?$ when $w = 13$

Substitute w with 13

$$R = 6(13 - 1) + 4 = 6(12) + 4 = 72 + 4 = 76$$

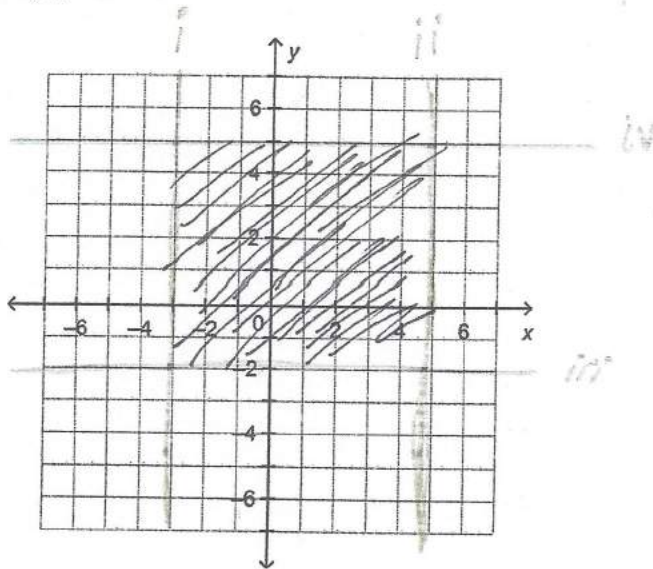
- ⑪ We must find which equation is correct, i.e. equals 17, when we substitute n for 2

- i) $P = 17(2) = 34$ (NOT right choice, since $P = 34$)
 ii) $P = 9(2) = 18$ (NOT 17)
 iii) $P = 6(2) + 5 = 17$ (this one works) \checkmark
 iv) $P = 17(2) - 9 = 34 - 9 = 25$

12. Graph these equations on the same grid. What shape is formed by the lines? (Remember to isolate the variable. Then, draw each line individually. For our purpose, you can join the points on the same line)

- i) $x = -3$
 ii) $x - 5 = 0$
 iii) $y + 2 = 0$
 iv) $y - 5 = 0$

You must solve for each variable!



The shape formed is a Rectangle

- i) $x = -3$ There is a line that goes through the $-x$ axis at -3 .

- ii) $x - 5 = 0$ • solve or isolate x
 $\xrightarrow{+5}$ $x = +5$ A line that goes through the $-x$ axis at $+5$.

- iii) $y + 2 = 0 \rightarrow y + \frac{2}{-1} = 0 - 2 \Rightarrow y = -2$ a line that goes through the $-y$ axis at -2 .

- iv) $y - 5 = 0 \rightarrow y - \frac{5}{+1} = 0 + 5 \Rightarrow y = +5$ a line that goes through the $-y$ axis at 5 .

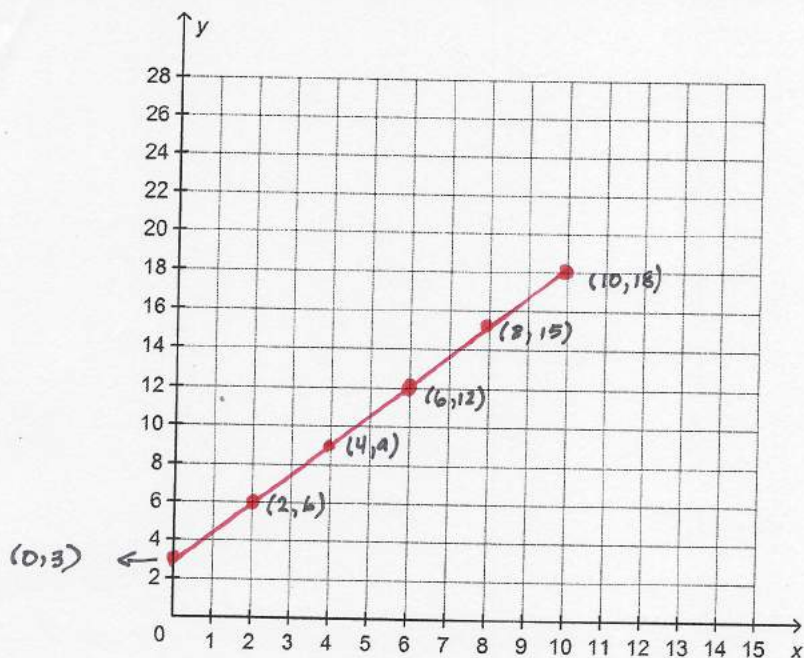
Problem

13. a) Create a table of values for the relation $y = 1.5x + 3$, then graph the relation.
Use 0, 2, 4, 6, 8, 10 as values of x .

x	0	2	4	6	8	10
y	3	6	9	12	15	18

→ +2 pattern

→ +3 pattern



- b) Is the relation linear? How do you know? *It is! there is a pattern on the x values and a pattern on the y values.*
- c) What is the value of y when $x = 33$?

$$y = 52.5$$

a) $y = 1.5x + 3$

$$x=0 = 1.5(0) + 3 = 3 \quad (0, 3)$$

$$x=2 = 1.5(2) + 3 = 6 \quad (2, 6)$$

$$x=4 = 1.5(4) + 3 = 9 \quad (4, 9)$$

$$x=6 = 1.5(6) + 3 = 12 \quad (6, 12)$$

$$x=8 = 1.5(8) + 3 = 15 \quad (8, 15)$$

$$x=10 = 1.5(10) + 3 = 18 \quad (10, 18)$$

c) $y = 1.5x + 3$ when $x = 33$

$$y = 1.5(33) + 3 = 49.5 + 3 = 52.5$$