

Writing Equations to Describe Relations

Sometimes you will be asked to write an equation to show how x and y (or whatever variables you are using) are related. Use the following steps:

- Check to see if you can add or subtract a number to x to get y . Remember to check at least 3 different terms, as it must work for all of them.

eg)

x	-2	-1	0	1	2
y	1	2	3	4	5

$y = x + 3$

Then test your equation using substitution ie)

$y = x + 3$	$y = x + 3$
$= (-2) + 3$	$= 2 + 3$
$= 1$	$= 5$

yes yes

eg)

x	9	10	11	12	13
y	2	3	4	5	6

 $y = x - 7$

Test it

$y = x - 7$	$y = x - 7$
$= 10 - 7$	$= 11 - 7$
$= 3$	$= 4$

yes ✓ yes ✓

- If that does not work, check to see if you can multiply or divide x by the same number to get y .

eg)

x	-2	-1	0	1	2
y	-8	-4	0	4	8

$y = 4x$

* You don't have to write out the substitution to check, can just do mentally.

eg)

x	-2	0	2	4	6
y	-1	0	1	2	3

$y = \frac{x}{2}$

- If this still does not work, try adding both variables together, or, subtracting one variable from the other to see if you get the same answer.

x	8	10	12	14	16
y	0	2	4	6	8

$x - y = 8$

x	-2	-1	0	1	2
y	7	6	5	4	3

$x + y = 5$

Practice: Write an equation to show how x and y are related in each example below.

①

x	6	7	8	9	10
y	8	9	10	11	12

$y = x + 2$ check: $y = 6 + 2$
 $y = 8$ ✓
 $y = 7 + 2$
 $y = 9$ ✓

②

x	2	4	6	8	10
y	6	12	18	24	30

~~$y = 3x$~~ ~~$y = 3x$~~ $y = 3x$

③

x	-2	-1	0	1	2
y	6	5	4	3	2

$x + y = 4$ CHECK! $(-2) + 6 = 4$ ✓
 $(-1) + 5 = 4$ ✓
 $1 + 3 = 4$ ✓

④

x	1	2	3	4	5
y	-1	0	1	2	3

$y = x - 2$ CHECK! $y = x - 2$
 $y = 1 - 2$
 $y = -1$ ✓

$y = x - 2$
 $y = 2 - 2$ ✓
 $y = 0$

⑤

x	y
-2	-10
-1	-5
0	0
1	5
2	10

$y = 5x$

⑥

x	y
10	2
11	3
12	4
13	5
14	6

$y = x - 8$ CHECK
 $y = 10 - 8$
 $y = 2$ ✓

$y = x - 8$
 $y = 11 - 8$
 $y = 3$ ✓