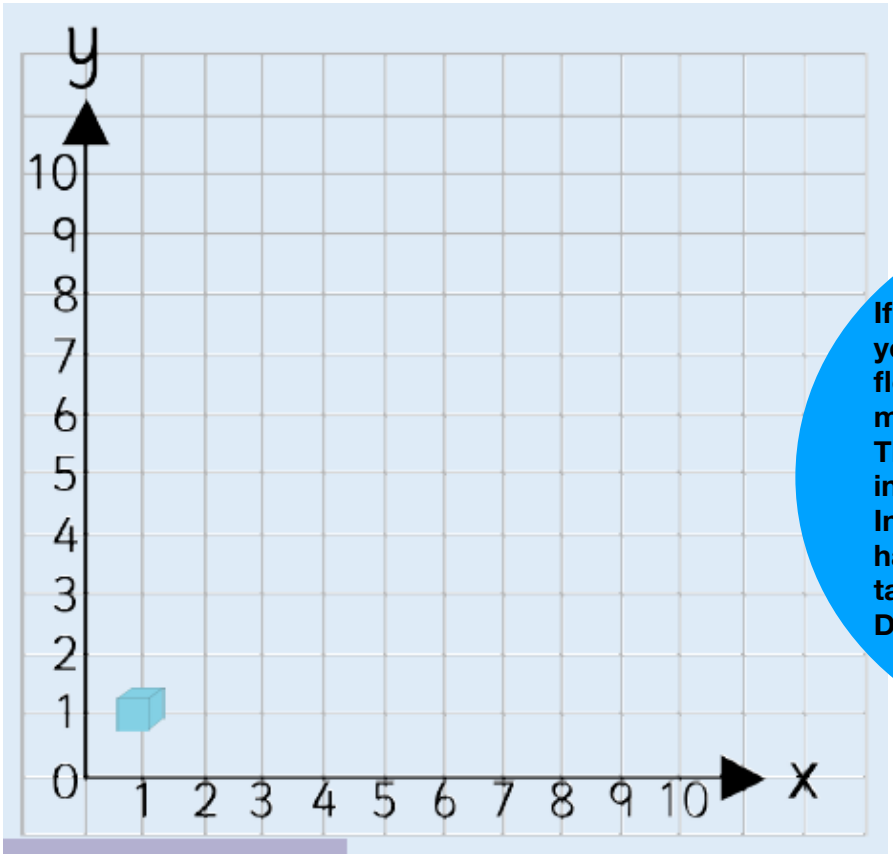
## 18/5/20 & 25/5/20  DIRECTIONS

**We are going to develop  our learning about coordinates by using them to plot in positions before we move them.**
**Moving a point or a shape is called TRANSLATION.**

**Lesson 1 Introduction**

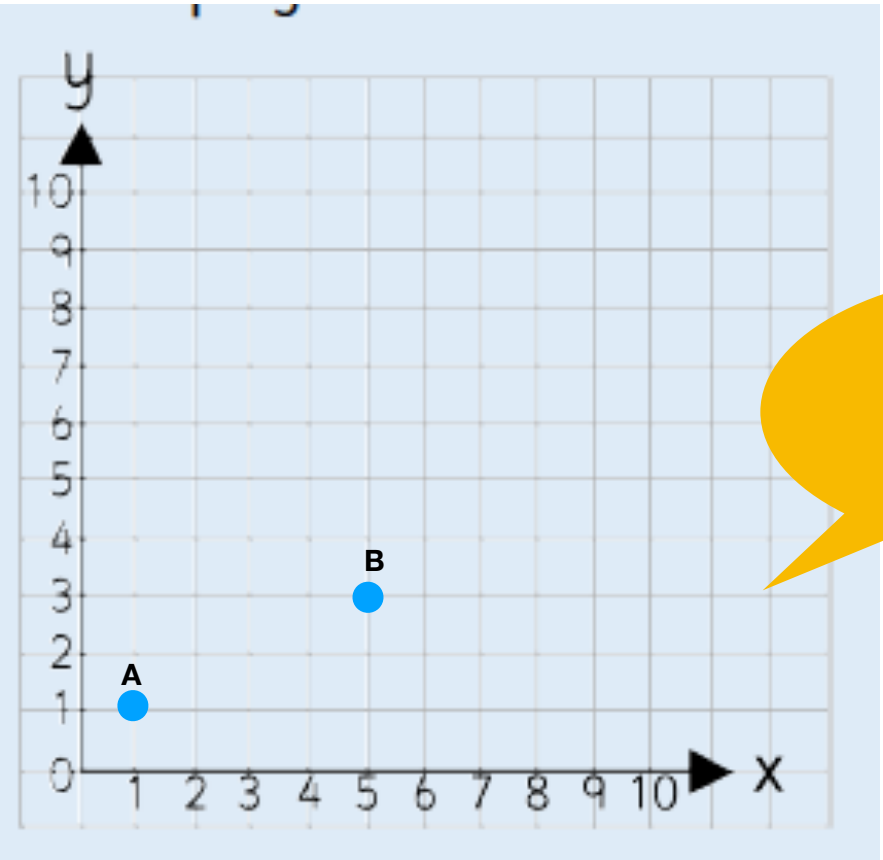



**If you have some outside space, you could chalk a grid on the floor or perhaps use tape to make  a grid.**
**Then use a small toy or box instead of a cube.**
**Inside, you could use tape on a hard floor - maybe masking tape.**
**DO ASK YOUR PARENTS FIRST!**

**Move the cube from its position  (1,1)  one unit up then one unit down , it returns to its start position.**
**(You can use your finger or the end of a pencil.)**

**If you move the cube three units right then three units left it also returns to its start position.**

**right**  **left**  **up**  **down**




**REMEMBER** that a unit on the grid is counted at the place where the x and y lines meet, not the actual square.

**Translate ( move) A to B.**

**Start coordinates (1, 1)**

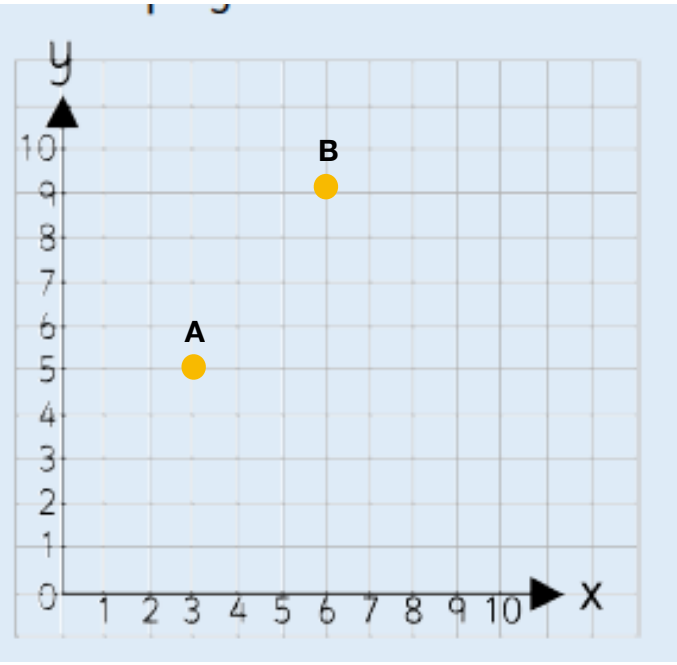
**Move 4 units to the right, then 2 units up.**

**Finish coordinates ( 5, 3)**

**You can also move up 2 then move right 4 to end in the same position.**

**The directions will tell you which ways to move.**

**right left up down**

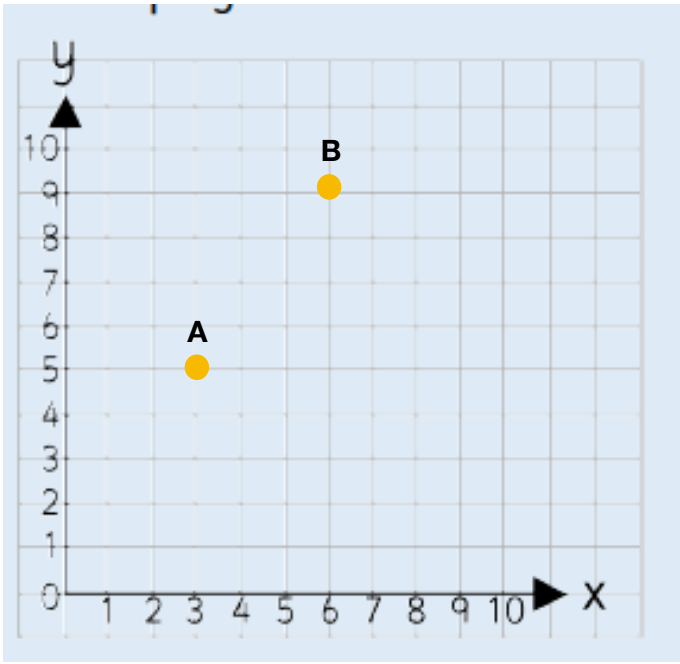



**Translate ( move) , from A to B.**

**Start coordinates ( , )**

**Move ____ units to the right, then ____units up.**

**Finish coordinates ( , )**

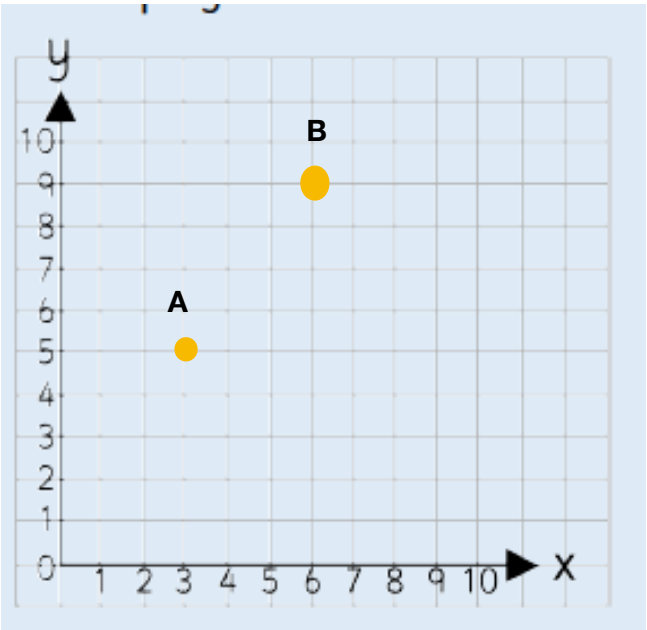



**Translate ( move) , from B to A.**

**Start coordinates ( , )**

**Move ____ units to the left then ____units down.**

**Finish coordinates ( , )**

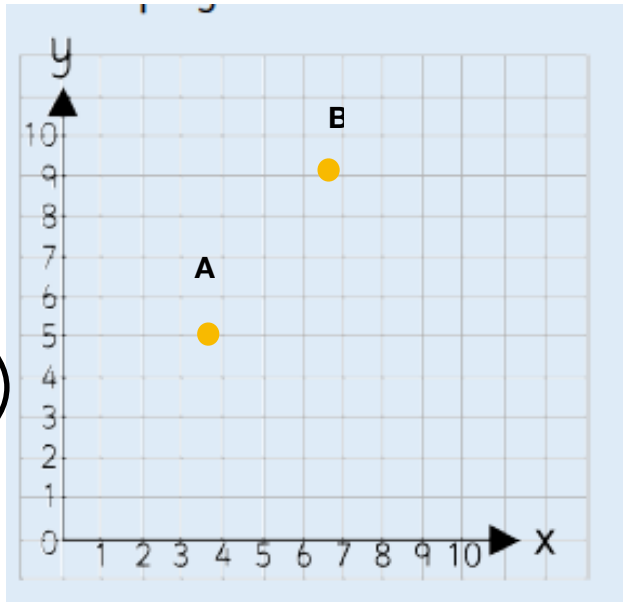



**Translate ( move) , from A to B.**

**Start coordinates ( 3 , 5 )**

**Move _ 3_ units to the right, then __4__units up.**

**Finish coordinates ( 6 , 9 )**




Notice that the number of units moved is the same.
But the DIRECTION changes.

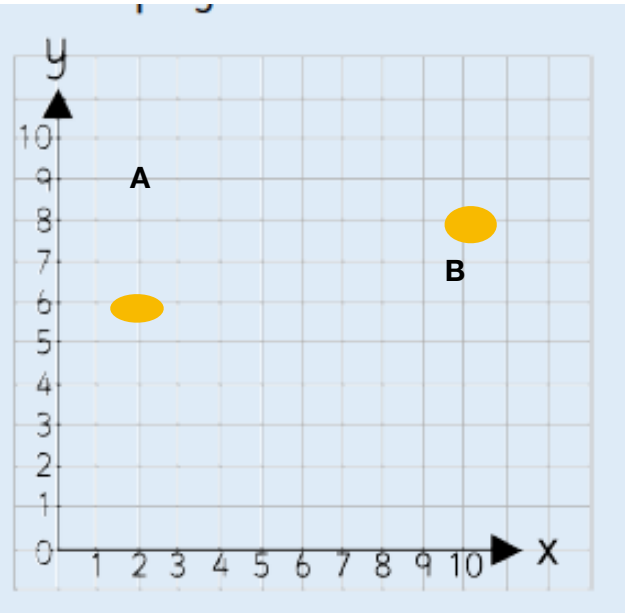
**Translate ( move) , from B to A.**

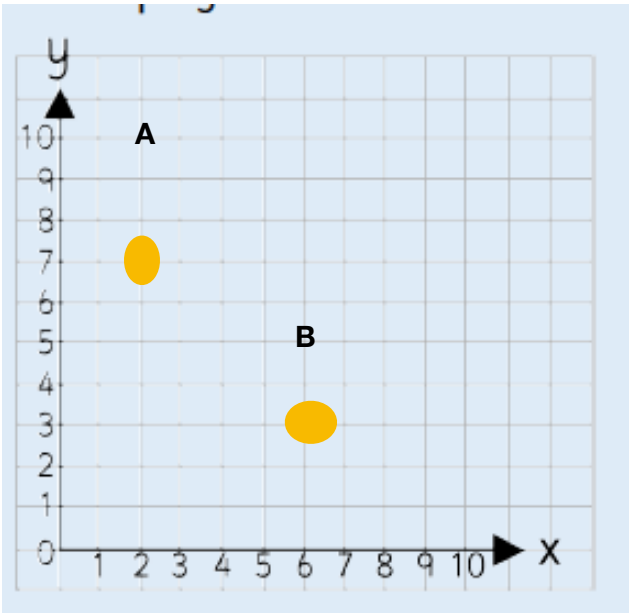
**Start coordinates ( 6 , 9 )**

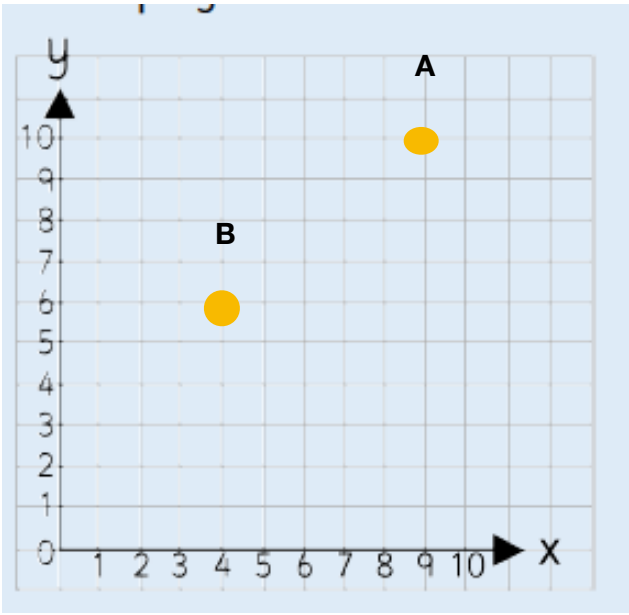
**Move __3__ units to the left then _4___units down.**

**Finish coordinates ( 3 , 5 )**

# Describe the moves (translations)

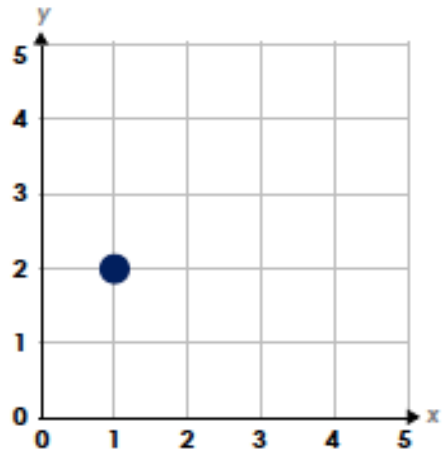


## Move on a Grid

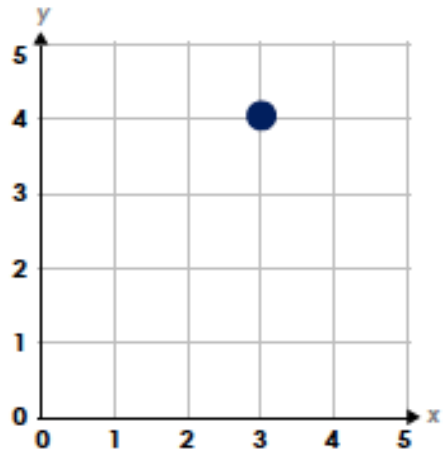
1a. Translate the point 2 squares right. Record the new coordinates.




VF

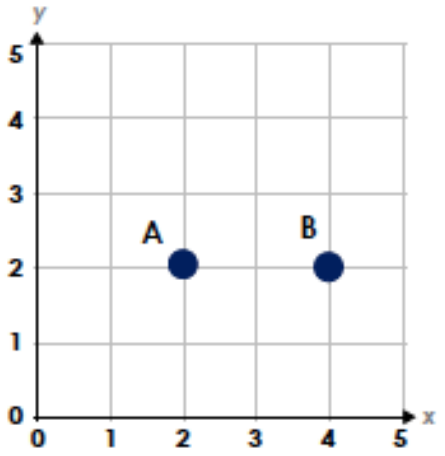
## Move on a Grid

1b. Translate the point 4 down. Record the new coordinates.



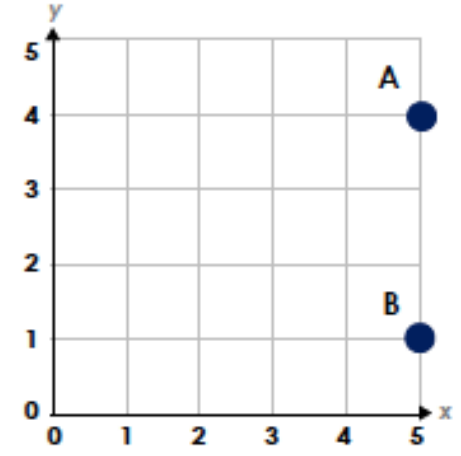

VF

2a. True or False? Point A has been translated 2 left to point B.



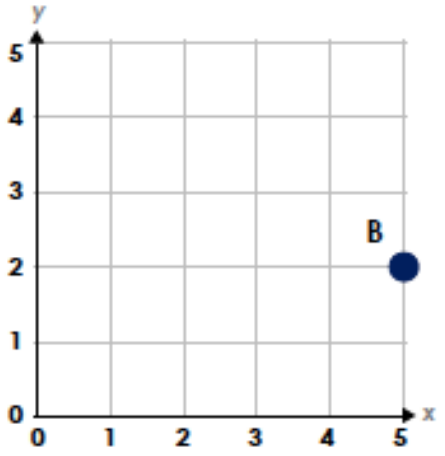

VF

2b. True or False? Point A has been translated 3 down to point B.



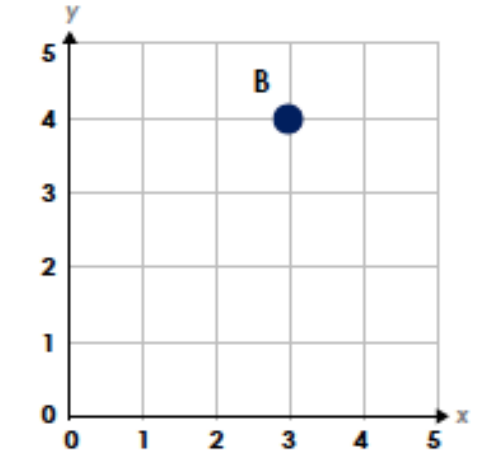

VF

3a. Point A has been translated 2 squares right to point B. Record the original coordinates for point A.



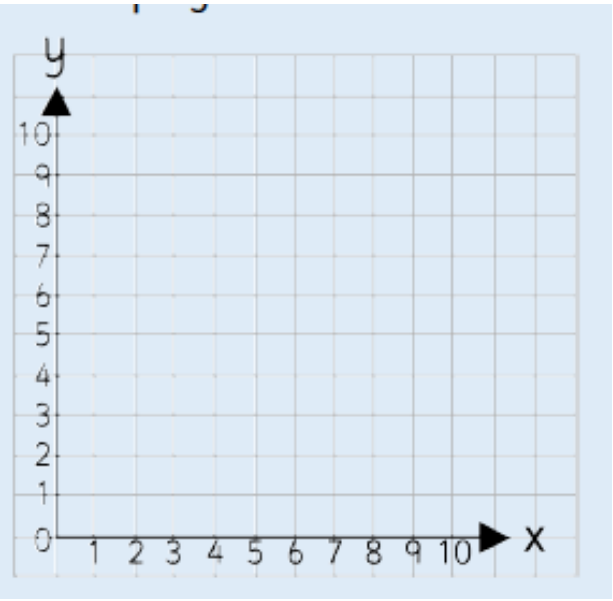

VF

3b. Point A has been translated 3 squares up to point B. Record the original coordinates for point A.




VF

## Draw the dots on the grids.

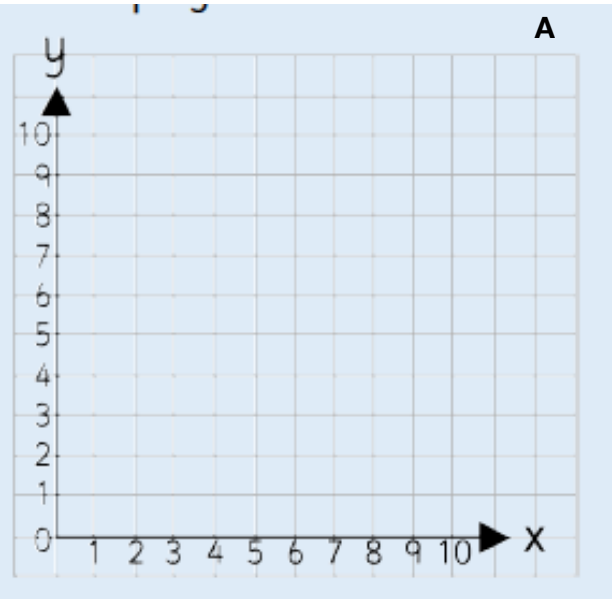



**1. Plot A at (2, 6)**

**Translate 6 Right , 4 Up.**

**Write the coordinate for B and plot on grid.**

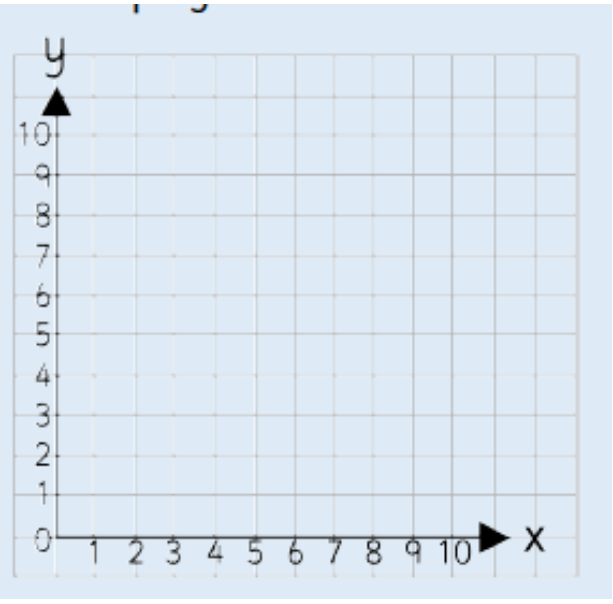
B




**2. Plot A at ( 3,7)**

**Translate 2 Right , 2 Up.**

**Write the coordinate for B and plot on grid.**



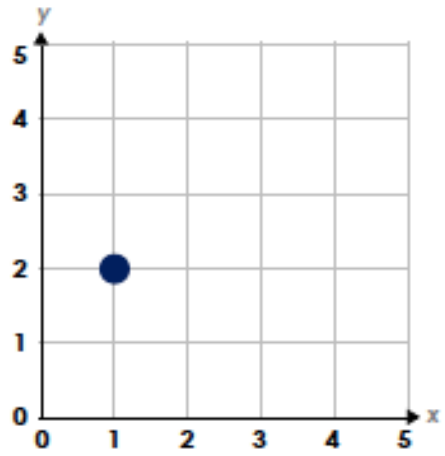

**3. Plot A at (6,8)**

**Translate 4 Left , 3 Down .**

**Write the coordinate for B and plot on grid.**

## Move on a Grid

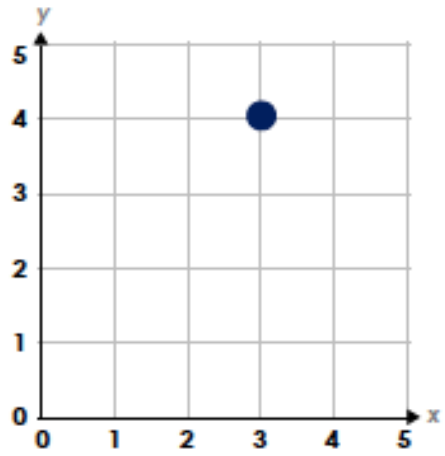
1a. Translate the point 2 squares right. Record the new coordinates.




VF

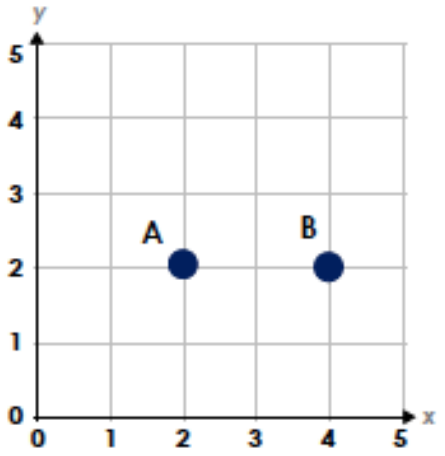
## Move on a Grid

1b. Translate the point 4 down. Record the new coordinates.



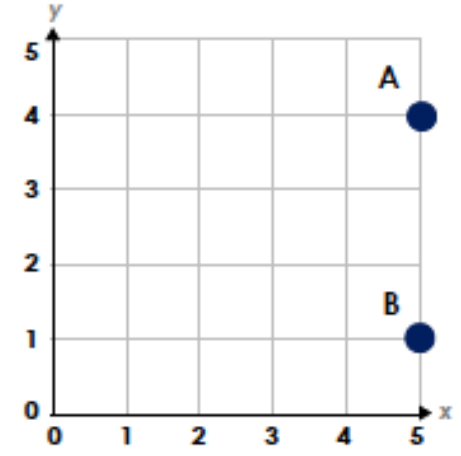

VF

2a. True or False? Point A has been translated 2 left to point B.



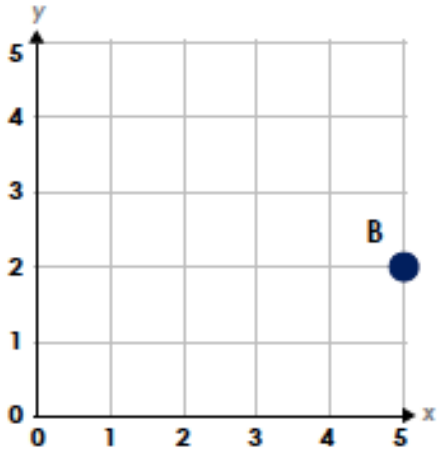

VF

2b. True or False? Point A has been translated 3 down to point B.



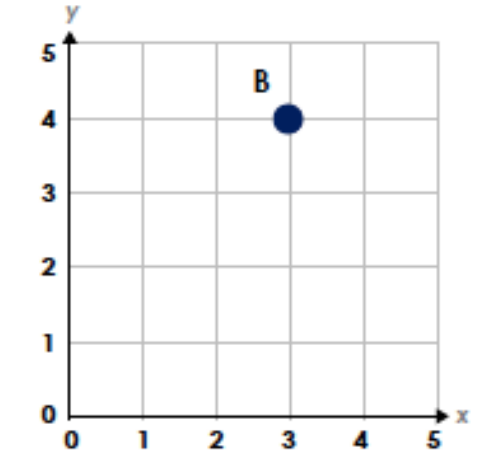

VF

3a. Point A has been translated 2 squares right to point B. Record the original coordinates for point A.




VF

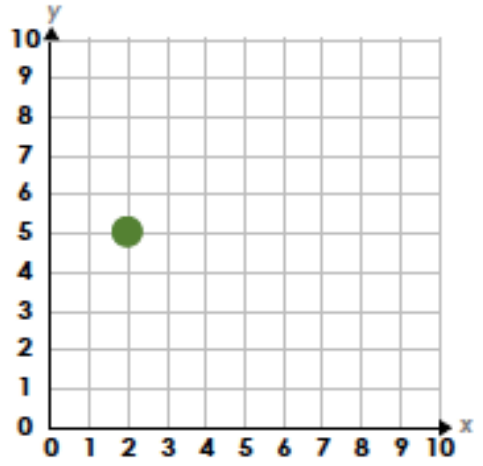
3b. Point A has been translated 3 squares up to point B. Record the original coordinates for point A.




VF

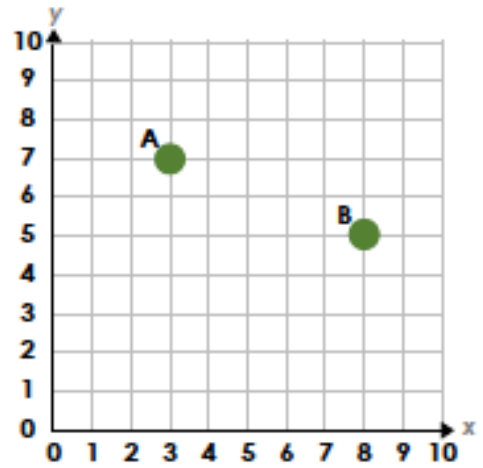
# Move on a Grid

4a. Translate the point 3 right and 4 down. Record the new coordinates.



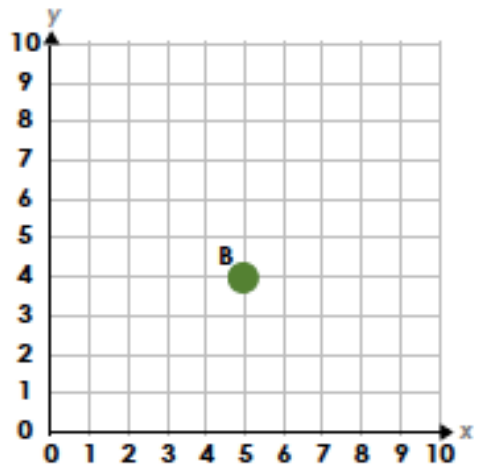

VF

5a. True or False? Point A has been translated 6 right and 2 down to point B.




VF

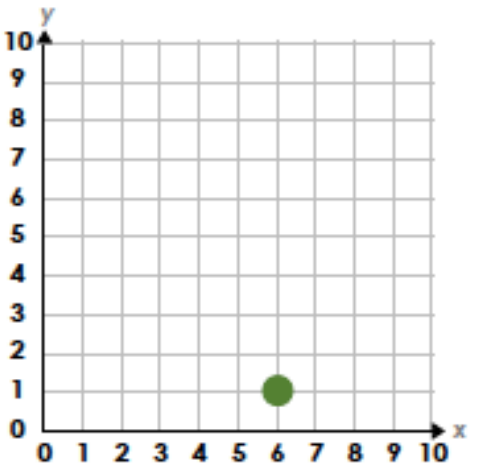
6a. Point A has been translated 3 squares right and 5 squares down to point B. Record the original coordinates for point A.




VF

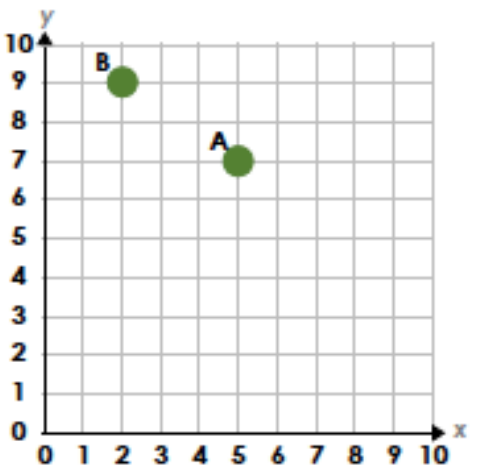
# Move on a Grid

4b. Translate the point 5 left and 2 up. Record the new coordinates.



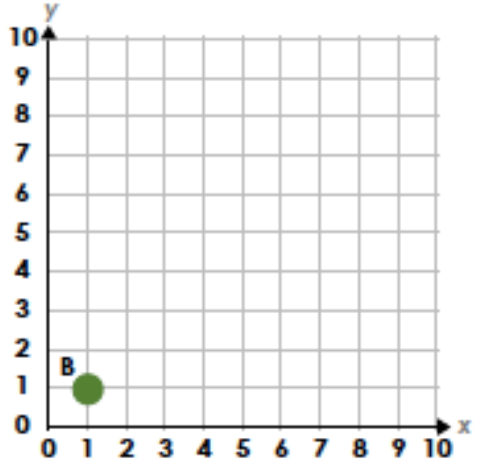

VF

5b. True or False? Point A has been translated 2 up and 3 left to point B.




VF

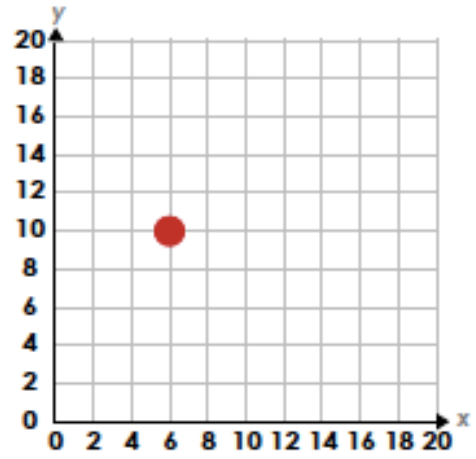
6b. Point A has been translated 3 squares left and 5 squares down to point B. Record the original coordinates for point A.




VF

## Move on a Grid

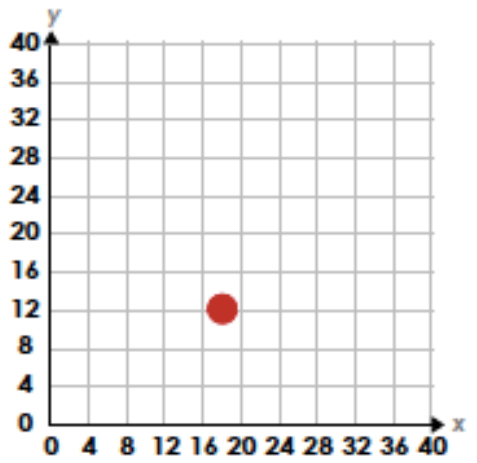
7a. Translate the point 4 left and 6 down. Record the new coordinates.




VF

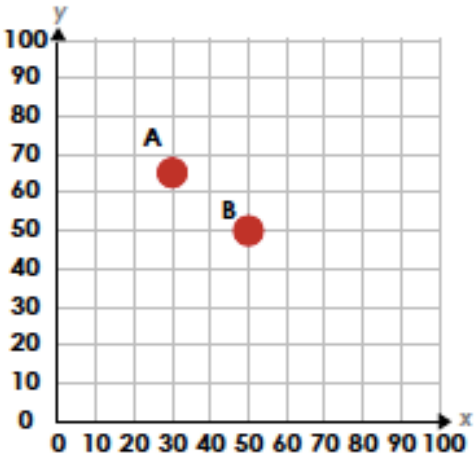
## Move on a Grid

7b. Translate the point 10 right and 12 up. Record the new coordinates.



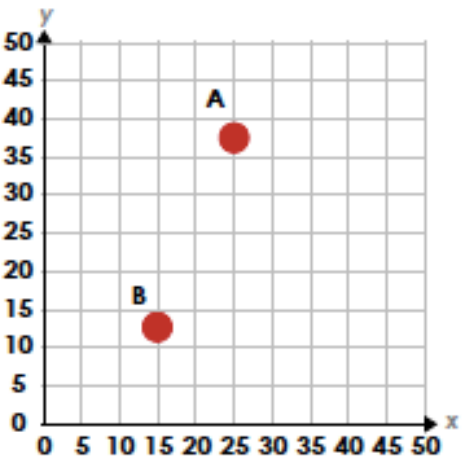

VF

8a. True or False? Point A has been translated 20 left and 15 down to point B.



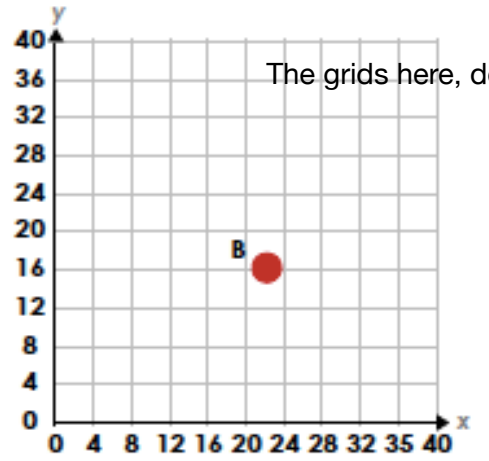

VF

8b. True or False? Point A has been translated 10 left and 25 down to point B.




VF

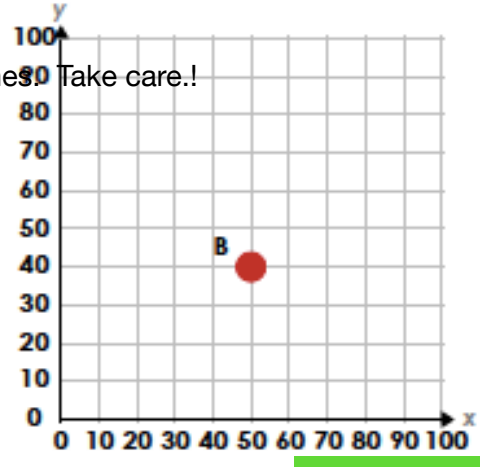
9a. Point A has been translated 10 right and 6 up to point B. Record the original coordinates for point A.




VF

The grids here, do not go up in ones! Take care.!

9b. Point A has been translated 5 right and 25 down to point B. Record the original coordinates for point A.




VF

**The grids do not always go up in ones.**

# ANSWERS

**Describe the Moves**

A (2,6)
Move 8 Right,
2 Up

B ( 10,8)

A (2. 7)

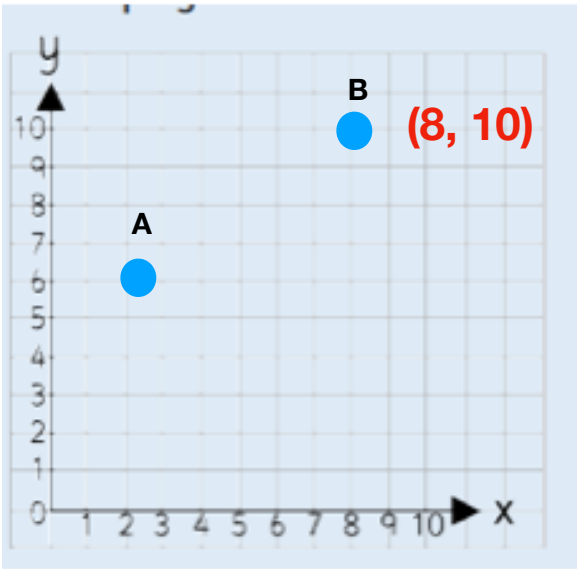
Move 4 Right,
4 Down

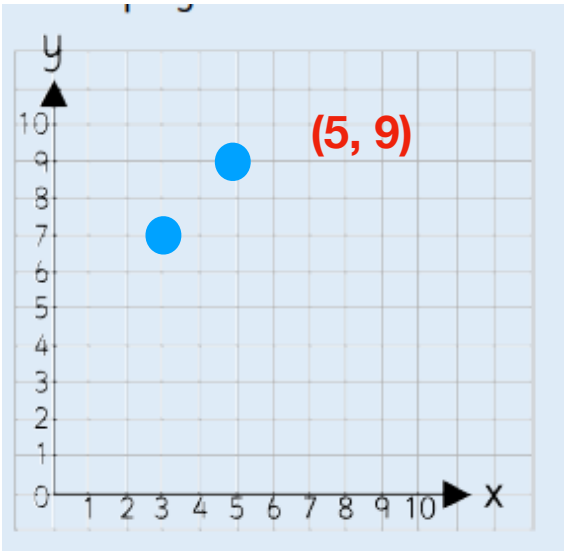
B ( 6,3 )

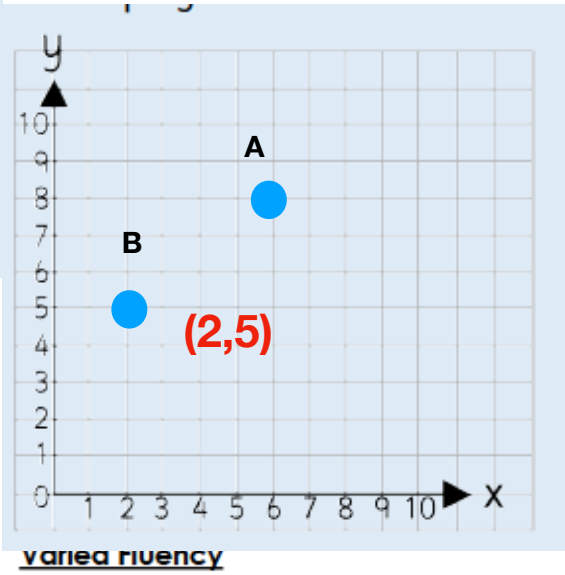
A (9,10)

Move 5 Left
4 Down

B (4, 6)




**Varied Fluency**
**Move on a Grid**

**Developing**
1a. (3, 2)
2a. False. The translation is 2 right.
3a. (3, 2)

**Expected**
4a. (5, 1)
5a. False. The translation is 5 right, 2 down.
6a. (2, 9)

**Greater Depth**
7a. (2, 4)
8a. False. The translation is 20 right, 15 down.
9a. (12,10)

**Varied Fluency**
**Move on a Grid**

**Developing**
1b. (3, 0)
2b. True.
3b. (3, 1)

**Expected**
4b. (1, 3)
5b. True.
6b. (4, 6)

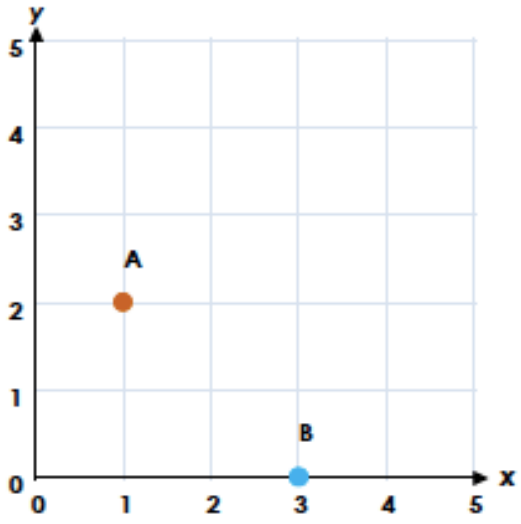
**Greater Depth**
7b. (28, 24)
8b. True
9b. (45, 65)

**Lesson 2 : Now try one of these**

# Move on a Grid

1. Points A and B have been translated three down. Record their original coordinate positions in the table below.

| Point | Original coordinates |
|---|---|
| A | ( , ) |
| B | ( , ) |

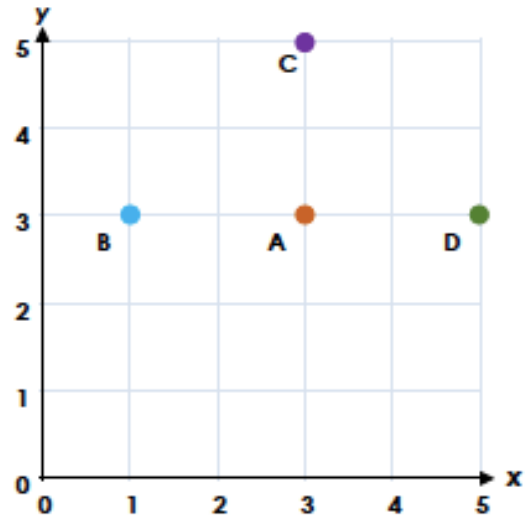



VF
HW/Ext

2. Which point has been translated 2 right from point A?

Complete the table to show how the other points have been translated from point A.

| Point | Left/Right | Up/Down |
|---|---|---|
| B | | |
| C | | |
| D | | |




VF
HW/Ext

3. Sam has been translating points.

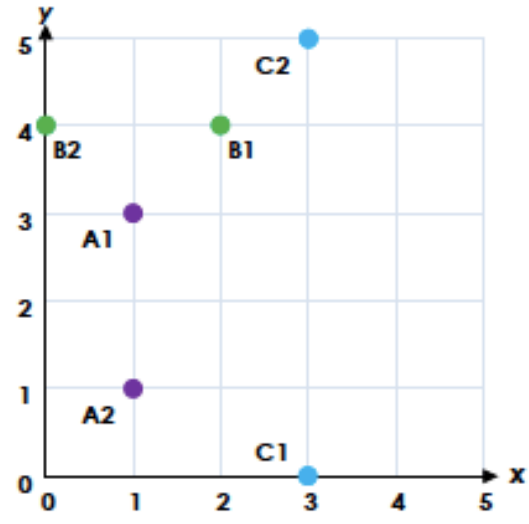
**Translations**

A1 to A2 3 down

B1 to B2 2 right

C1 to C2 5 up

Correct and explain any errors he has made.

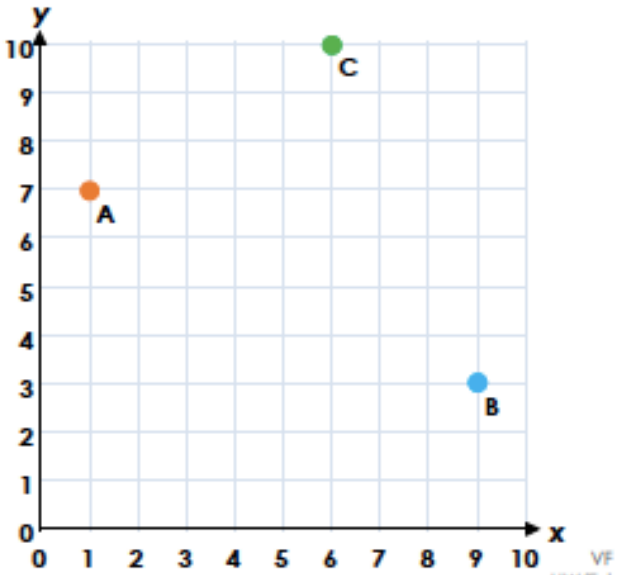



RPS
HW/Ext

# Move on a Grid

4. Points A, B and C have been translated one right and two up. Record their original coordinate positions in the table below.

| Point | Original coordinates |
|---|---|
| A | ( , ) |
| B | ( , ) |
| C | ( , ) |

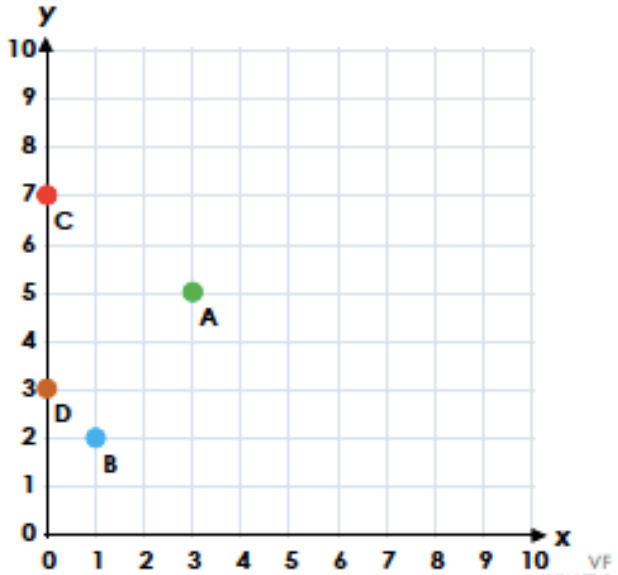



VF
HW/Ext

5. Which point has been translated 3 left and 2 down from point A?

Complete the table to show how the other points have been translated from point A.

| Point | Left/Right | Up/Down |
|---|---|---|
| B | | |
| C | | |
| D | | |



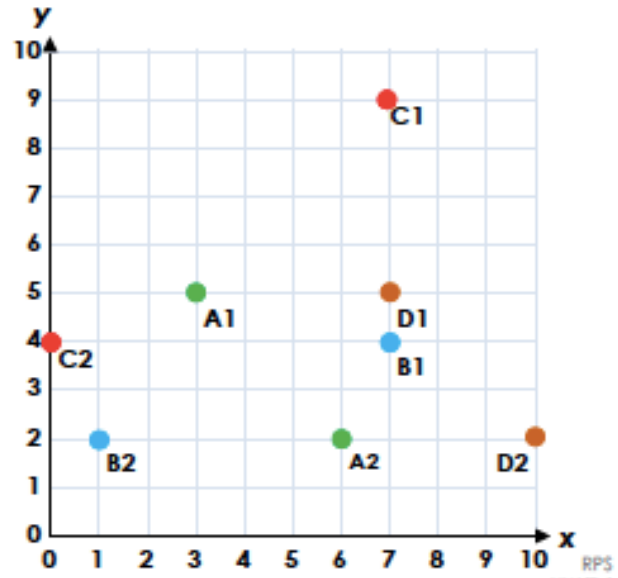

VF
HW/Ext

6. Lorna has been translating points.

**Translations**

| | | |
|---|---|---|
| A1 to A2 | 4 right | 3 down |
| B1 to B2 | 6 left | 2 down |
| C1 to C2 | 5 left | 7 down |
| D1 to D2 | 3 right | 3 up |

Correct and explain any errors she has made.

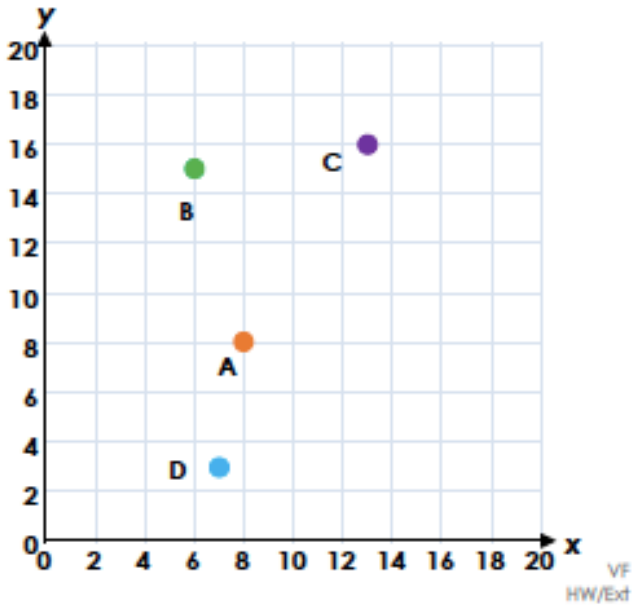



RPS
HW/Ext

# Move on a Grid

7. Points A, B, C and D have been translated six right and two up. Record their original coordinate positions in the table below.

| Point | Original coordinates |
|---|---|
| A | ( , ) |
| B | ( , ) |
| C | ( , ) |
| D | ( , ) |

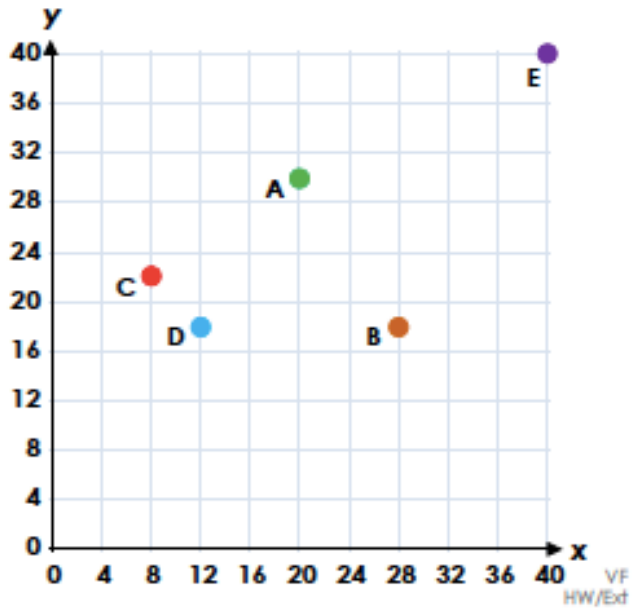



VF
HW/Ext

8. Which point has been translated 8 left and 12 down from point A?

Complete the table to show how the other points have been translated from point A.

| Point | Left/Right | Up/Down |
|---|---|---|
| B | | |
| C | | |
| D | | |
| E | | |



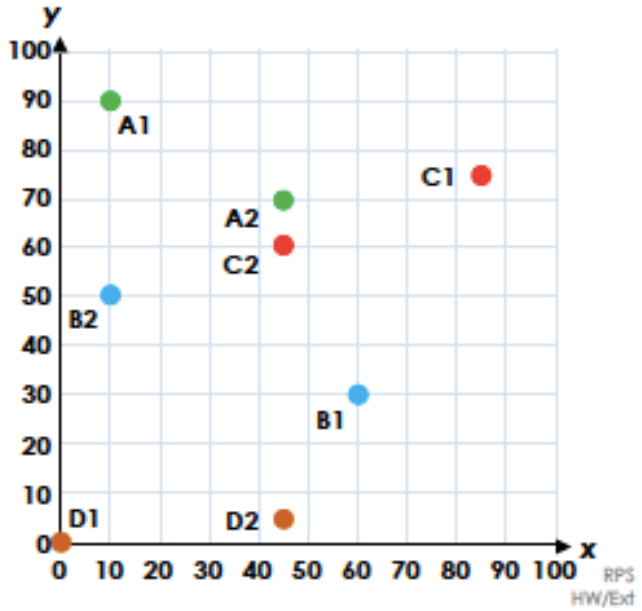

VF
HW/Ext

9. Luke has been translating points.

**Translations**

| | | |
|---|---|---|
| A1 to A2 | 35 right | 20 down |
| B1 to B2 | 50 left | 25 up |
| C1 to C2 | 15 left | 40 down |
| D1 to D2 | 45 right | 5 up |

Correct and explain any errors he has made.




RPS
HW/Ext

## Homework/Extension
## Move on a Grid

**Developing**

1. A = (1, 5); B = (3, 3)
2. Point D. B = 2 left; C = 2 up
3. A is incorrect. Sam has translated the point 2 down instead of 3 down.
   B is incorrect. Sam has translated the point 2 left instead of 2 right.

**Expected**

4. A = (0, 5); B = (8, 1); C = (5, 8)
5. Point D. B = 2 left, 3 down; C = 3 left, 2 up
6. A is incorrect. Lorna has translated the point 3 right instead of 4 right.
   C is incorrect. Lorna has translated the point 7 left and 5 down, not 5 left and 7 down.
   D is incorrect. Lorna has translated the point 3 down instead of 3 up.

**Greater Depth**

7. A = (2, 6); B = (0, 13); C = (7, 14); D = (1, 1)
8. Point D. B = 8 right, 12 down; C = 12 left, 8 down, E = 20 right, 10 up
9. B is incorrect. Luke has translated the point 20 up instead of 25 up.
   C is incorrect. Luke has translated the point 40 left and 15 down, not 15 left and 40 down.

**You might want to practise coordinates in the first quadrant at :**
https://mathsframe.co.uk/en/resources/resource/153/coordinates__reasoning_about_position_and_shapes#

**Scroll down the page until you find the blue box with play game button. You can use grid to help.**

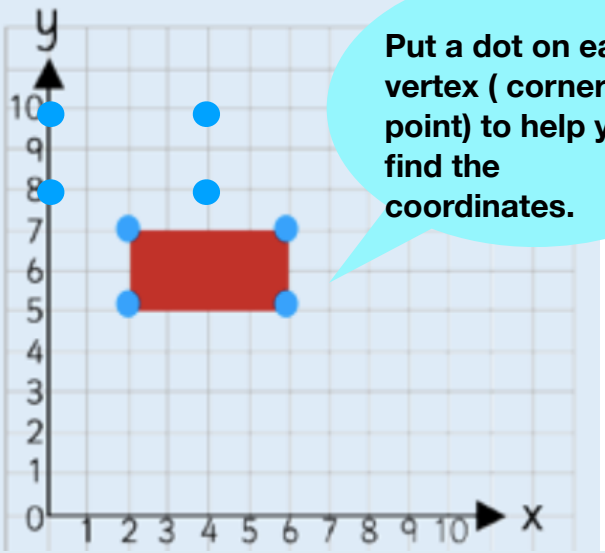
**I couldn't find any other suitable games for translation but you might be able to. Let me know.**

**Lesson 3**

## Translate a regular shape

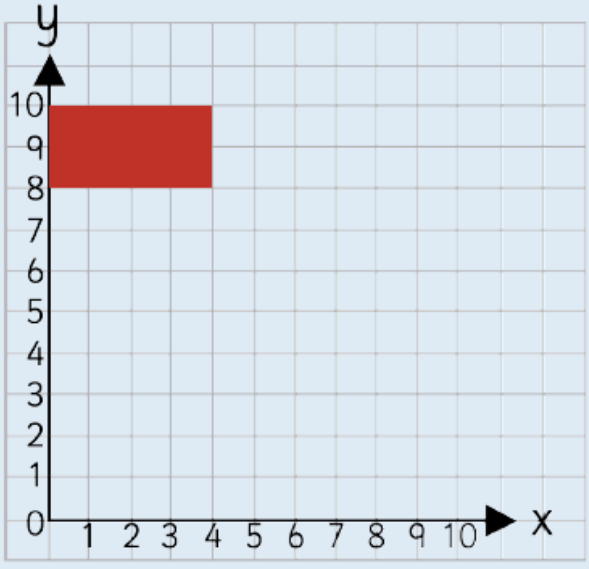
- **Each corner of a *regular polygon* ( straight sided 2D shape) is called a *vertex.* More than one makes a set of vertices.**
- **When we put a shape on a grid, each vertex has a coordinate. This is the place where 2 lines meet to make a point.**

Translate the rectangle 2 left and 3 up.
Write down the coordinates of each vertex of the rectangle before and after translation.




**Put a dot on each vertex ( corner/ point) to help you find the coordinates.**

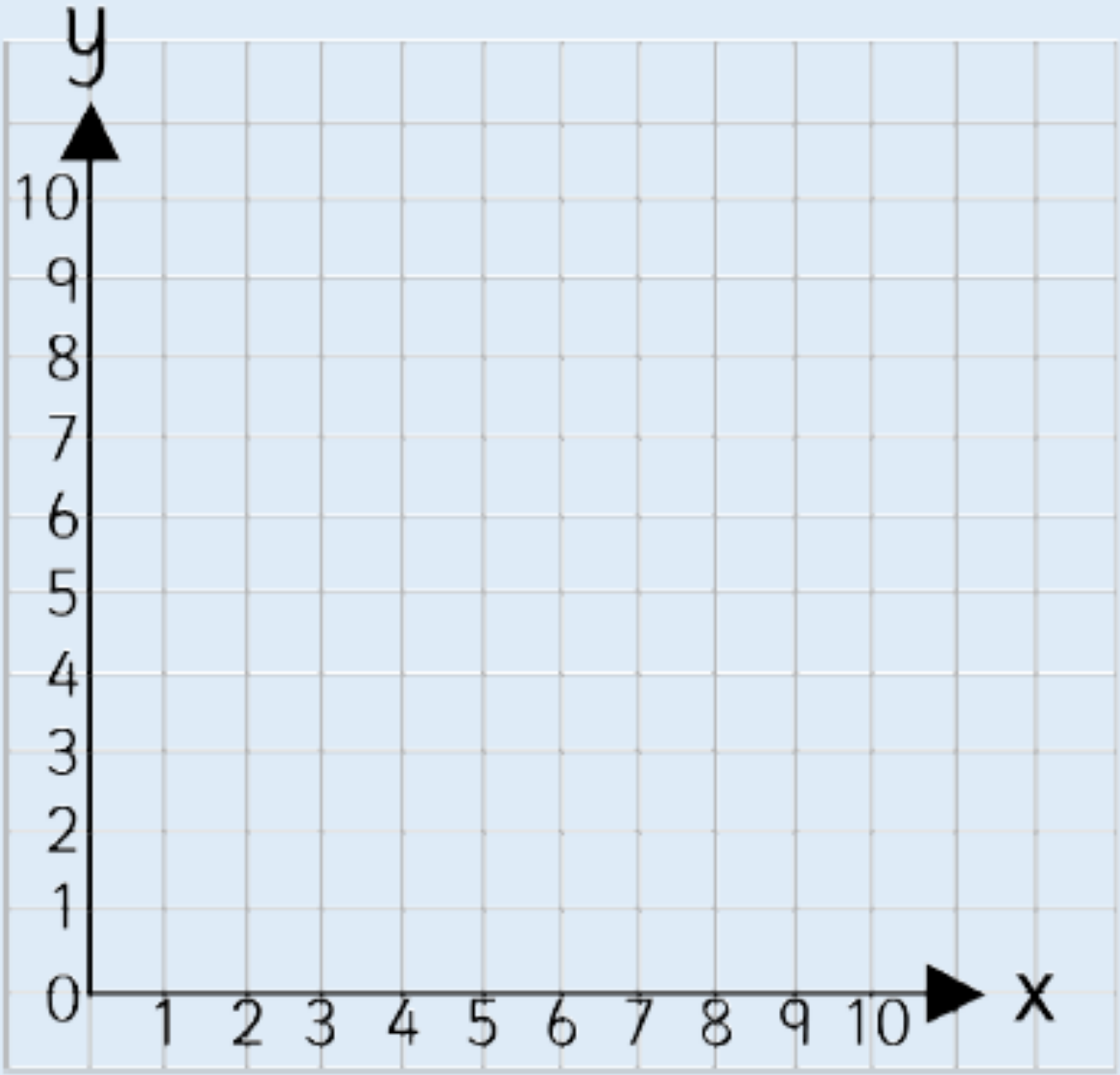
**Next, translate each coordinate using the same direction step. Here , it is 2 left and 3 up.**




Before: (2, 5), (6, 5), (6, 7), (2, 7)
After: (0, 8), (4, 8), (4, 10), (0, 10)

**The rectangle has been translated to a new position on the grid.**
**Notice that the y axis is 0 . ( The x axis is also 0.**

- **Draw a square,  a rectangle and a triangle on the grid.  Make sure you leave room to draw each one again after translation.**
- **Write down the coordinates for each vertex of  the shape before and after translation.**
- **Draw the shapes in their new positions.**
- **You could try  a hexagon and an octagon, too - use a new grid.**

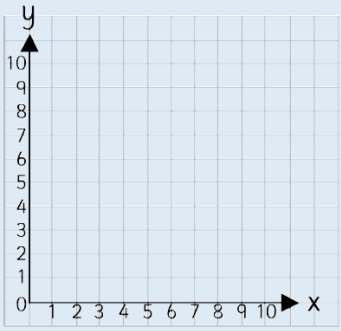


Reasoning 2 Move on a Grid

Here is a game to play in pairs.

# PLAY A GAME

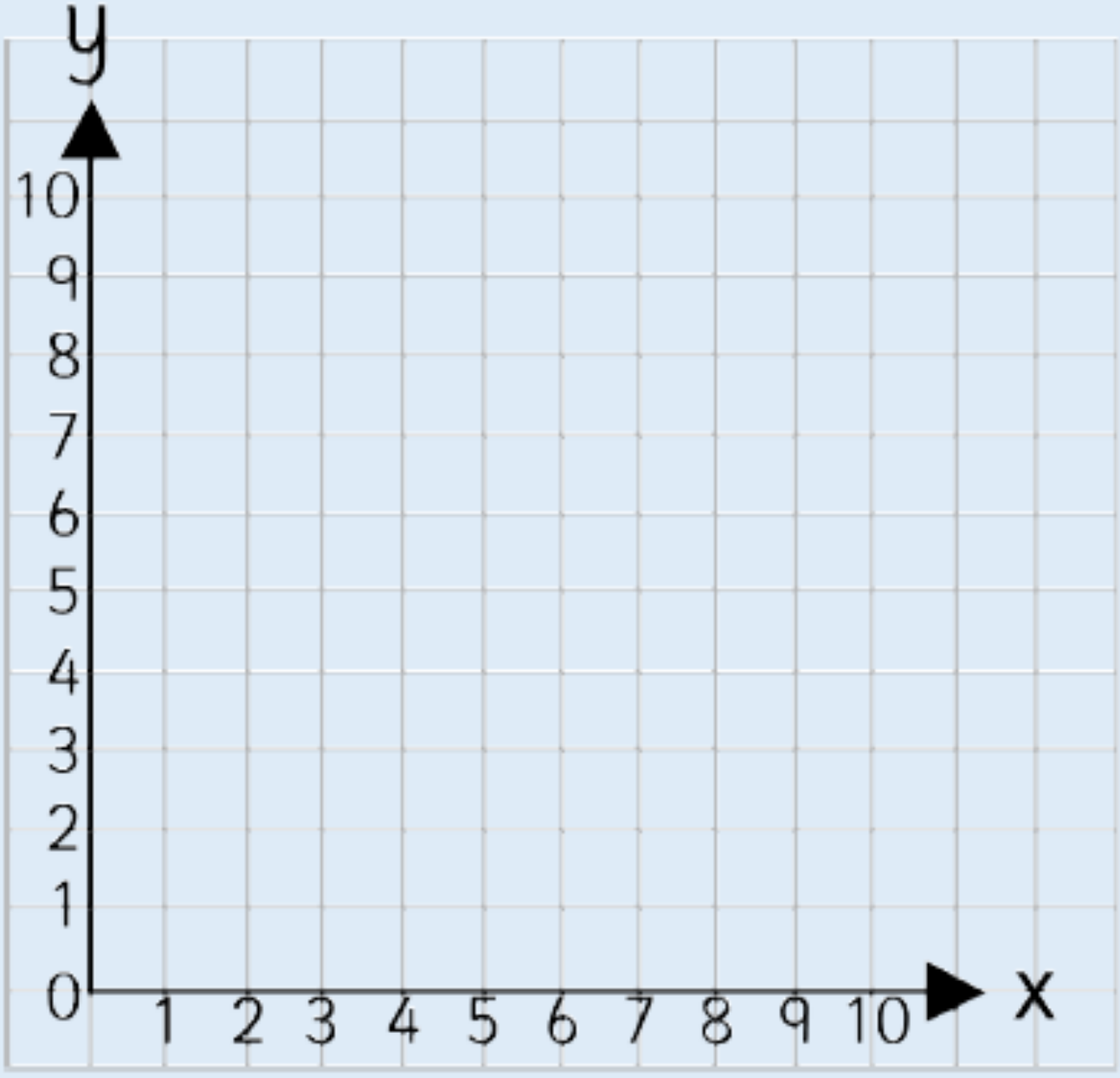
Each player needs:




One small cube

One barrier (e.g. a mini whiteboard)

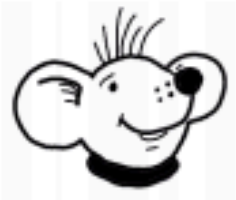
- The first player places a cube on their grid. They describe the original position and perform a translation.
- The second player listens to the instructions and performs the same translation.
- They check to see if they have placed their cube at the same coordinate(s).
- Swap roles and repeat several times.



**Just a bit of fun with shapes.  A TANGRAM PUZZLE**
**Cut out the shapes then join them together to make shapes.**
**How many different animals can you make?**

This week’s number puzzle





# Puzzle time

## Dizzy digits

You can play around with your calculator to work out this puzzle.

You can use the +, –, x , ÷ and = keys.

This puzzle is in three parts. You need to answer all three parts.

**Part 1:** Use four 4's to make 44

**Part 2:** Use five 5's to make 55

**Part 3:** Use six 6's to make 66

Now let's see....
4 + 4 + 44 = 52
that's no good
How about
44 x 4 - 4
Errm...not quite.

**Remember: You can use any of the +, –, x , ÷ and = keys.**