

Grid Algebra: Getting to know your grids 1: Name: _____

This multiplication table is formed with the rows being multiples of the first column.

Grid 1: Complete the Multiplication table:

Rows \ Columns	1	2	3	4	5	6	7
1	1	2	3	4	5	6	7
2		4	6	8	10	12	14
3			9	12		18	
4		8	12	16	20		28
5		10					
6						36	

Picture yourself moving from cell to cell, left and right in the rows and up and down in the columns to answer the following questions. Remember your answers for later.

1. What arithmetic happens when you move to right in row 1? _____
2. What arithmetic happens when you move to the right in row 3? _____
3. What arithmetic happens when you move to the left in row 5? _____
4. What arithmetic happens when you move down from row 1 to row 2? “x by 2”.
5. What arithmetic happens when you move down from row 2 to row 6? _____
6. What arithmetic happens when you move up from row 4 to row 1? _____

Grid 2: This multiplication table is starting further to the right than the last one. **Complete the table.** Do the answers to questions 1 - 6 apply in this new table? Answer questions 7 - 10.

1			16	17			
2			32				
3				51			
4							
5		75			90		
6			96				

7. What happens to numbers in the row 2 when you move down to row 4? _____
8. What happens to numbers in row 3 when you move up to row 1? _____
9. What happens to numbers in row 6 when you move up to row 2? _____
10. What happens to numbers in row 3 when you move left 3 cells? _____

Grid Algebra: Getting to know your grids 2: Name: _____

Hold onto the ideas learned on the previous page to help you complete each mini-multiplication table (Be careful to note what the row is a multiple of): There are left/right moves and up and down moves to consider. You can use either or both to help think.

Grid 3:

1				15			
2							

Grid 4:

1							
2					44		

Grid 5:

2				22			
3			30				

Grid 6:

1							
2					12		
3		9					

Now check that you have correctly figured out your four grids. You can compare with people around you and check you have the following bottom rows for each grid.

Grid 3: 26, 28, 30, 32, 34, 36

Grid 4: 38, 40, 42, 44, 46, 48

Grid 5: 27, 30, 33, 36, 39 42

Grid 6: 9, 12, 15, 18, 21, 24

DO NOT COMPLETELY FILL IN THESE GRIDS. Instead use mental and logical skills to figure out the value of each cell containing a letter in the grids: (Remember Grid 5 can help here)

Grid 7:

1					8		B=
2		C=			A=		

A = _____ B = _____ C = _____ D = _____ E = _____ F = _____

Grid 8:

1					D=		F=
2			E=		24		

G = _____ H = _____ I = _____ J = _____ K = _____ L = _____

Grid 9:

2			J=	I=			K=
3		G=		18	L=		H=

Grid Algebra: Getting to know your motions 1: Name: _____ Date: _____

Complete this grid this as a multiplication table:

1			6				
2							

This first grid could be rewritten by showing motion as operations and not values. Here is what it would look like if we started at "6":

1		6-1	6	6+1	6+2	6+3	6+4
2		2(6-1)	2(6)	2(6+1)	2(6+2)	2(6+3)	2(6+4)

Write this grid in operation form (not value form) based on 15 as the starting point:

1				15			
2							2(15+3)

What would this grid look like in operation form if we started in row 2 at 22?

1				$\frac{(22 + 2)}{2}$			
2			22				

Complete this grid in operation form: (Hint: where is "30-4"?)

1							
2			2(30-4)				

Complete this grid in operation form:

1			10				
2							
3							

Compare your last 2 cells in each row with the following: these two are most likely: [10+3][10+4]
 [2(10+3)] or [2(10)+6]; [2(10+4)] or [2(10)+8];
 [3(10+3)] or [3(10)+9]; [3(10+4)] or [3(10)+12];

Grid Algebra: Getting to know your motions 2: Name: _____ Date: _____

Complete this grid in operation form:

1		$\frac{12 - 6}{3}$				
2						
3						

Are there alternate ways to complete the grid? Compare your answers with others.

Show with values in the cells that the journey the arrows take you on from A to B to C

1		$A =$		$B =$	
2				$C =$	
3		$3(10-3)$			

Now, without completing the whole grid, describe the journeys that take you from 12 to each of the letters shown. "A" is shown using the two most efficient pathways

1	12		B		
2				F	
3	C		D		
4		$A = 4(12+1)$ or $A = 4(12)+4$	E		
5		H			G

Show the two most efficient ways to get to each letter from 12. Again, A is done for you.

1		B	12			
2						D
3				E		
4		C		A = 4(12+1) A = 4(12)+4		F
5					H	

From the endpoint, trace backwards to the journey's single number start. Show each step/space.

EX: 1			1. $\frac{12-6}{2}$			
2			2. 12-6	↓	→	3. 12

1						$\frac{30+6}{2}$
2						

1						
2			2(18+2) - 2			

1				$\frac{24-3}{3}$		
2						
3						

Complete the grid in terms of "A": Show two different paths, at most to each square:

1		$A-2$		A		$A+2$	
2				$2A$		$2(A+2)$ or $2A + 4$	
3							

Find where the single letter is for each of these endpoints and write it in the correct box:

1						$B+3$
2						

1		$\frac{n}{2} - 1$				
2						

1						
2						$2(h+3)$

1		$\frac{u-6}{2}$				
2						

1						
2					$2(p-1)+4$	

Grid Algebra : Numbers to letters Name: _____ Date: _____

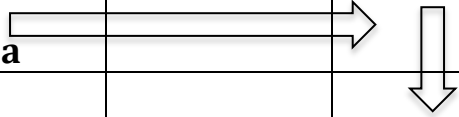
Complete the grid in terms of "x": A clue is given

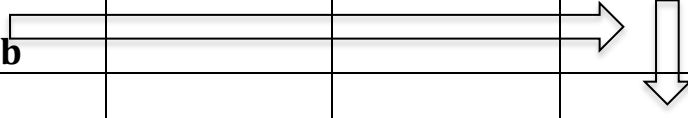
1				x		
2						

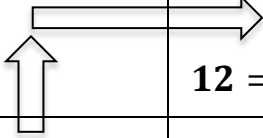
1						
2				x - 2		

1						
2					2(x+2)	

Work out the number value of the single letter (beginning) in each case:

1			a 	
2				16=2(a+2)

1			b 	
2				24=2(b+3)

1					
2			c	$12 = \frac{c}{2} + 1$	

Grid Algebra: Tracking Changes 1

Name: _____

Picture the following be a multiplication table with the rows being multiples of the left column.

Complete the table: Given that the circled 1 is the starting point, describe the operation each time to move to the next numbered squares

1		(4)	(3)		(7)	
2	(1)		(2)			
3						
4						
5		(5)			(6)	
6						

7. What happens to “1” when you move to “2”?
8. What happens when you move from “2” to “3”?
9. What happens when you move from “3” to “4”?
10. What happens when you move from “4” to “5”?
11. What happens when you move from “5” to “6”?
12. What happens when you move from “6” to “7”?

Describe the journey that you take from the circled 1 in numerical order. Show how your expression grows with proper notation. An example of 4-step journey for 12 is shown.

1	12			$\frac{3(12) + 9}{3}$	$\frac{3(12) + 9}{3} + 1$
2	(1) A	(4)			(5)
3	3(12)			3(12)+9	
4	(2)	(3)			
5					
6					(6)

Grid Algebra: Tracking Changes 2 Name: _____

Describe each letter in terms of "A": Show the two easiest paths to each letter: p to d is shown

1			(A)			$d = \frac{p}{2} + 2$ $d = \frac{p + 4}{2}$	
2				p			(x)
3					(n)		

Number the grid squares in order of the journey shown: $2\left(\frac{2(a+4)-4}{2}\right) - 4$

1		a				
2						

Number the grid squares in order of the journey shown: $2((h + 2) - 1) - 4$

Note: a hint for where "1" starts is shown by the position of 2h+6

1						
2						2h+6

Number the grid squares in order of the journey shown: $3\frac{2((c+6)-2)-4}{4} - 6$

Note: "1" starts at c: A partial step is included as a hint

1						
2			(1) c			
3						
4					2((c+6)-2)	(4)

Grid Algebra: Inverted Travel = Inverse Operations to Equations Name: _____

Complete the grid in terms of "x": Find 'x' first then fill in each other square from the 'x' square

1							$\frac{x + 2}{2}$
2							

The given journey's end is shown and equals 40; write 'c' in the correct box and its value:

1							
2							
3							
4							
5							$5\left(\frac{3(c + 4) - 12}{6} + 3\right) + 10 = 40$
6							

Use the grid above to help solve these equations:

$$\frac{(k+18)}{3} = 16$$

$$12 = \frac{2(w+6)-6}{3}$$

$$7 = \frac{2(f+1)-4}{2} + 2$$

$$\frac{(h-8)}{2} + 5 = 30$$

$$\frac{4\left(\frac{b+6}{3}-1\right)+4}{2} = 12$$

$$9 = \frac{2(f+1)-4}{2} - 2$$

Make your own challenge for others!