

Group Work : DA for $n=3 \dots$ in action. (2 parts)

(1) Fill in below chart by writing a as $a = 3q + r$ with $q, r \in \mathbb{Z}$ and $0 \leq r < 3$.

order to do	a	r	$a = 3q + r$
15	-6	0	$-6 = 3(-2) + 0$
14	-5	1	$-5 = 3(-2) + 1$
13	-4	2	$-4 = 3(-2) + 2$
12	-3	0	$-3 = 3(-1) + 0$
11	-2	1	$-2 = 3(-1) + 1$
10	-1	2	$-1 = 3(-1) + 2$
1 st	0	0	$0 = 3(0) + 0$
2 nd	1	1	$1 = 3(0) + 1$
3 rd	2	2	$2 = 3(0) + 2$
4	3	0	$3 = 3(1) + 0$
5	4	1	$4 = 3(1) + 1$
6	5	2	$5 = 3(1) + 2$
7	6	0	$6 = 3(2) + 0$
8	7	1	$7 = 3(2) + 1$
9	8	2	$8 = 3(2) + 2$

continued 

Part 1 continued. Let $a, q, r \in \mathbb{Z}$.

If $a = 3q + r$, then $a - r = \underline{\quad 3q \quad}$
and so 3 divides $a - r$.

(2) For the integers a with $-6 \leq a \leq 8$,
we just divided a by $3 \in \mathbb{N}$ and found the remainder $r \in \{0, 1, 2\}$.

Let's compare the integers that have the same remainder r
by completing the below chart so that as we read
down a column the numbers are increasing.

Under a "remainder column", write the $a \in \mathbb{N}$ for $-6 \leq a \leq 8$
that have that column's remainder.

division by 3	$r=0$	$r=1$	$r=2$
	-6	-5	-4
	-3	-2	-1
	0	1	2
	3	4	5
	6	7	8

If we take the difference between any two
numbers in the same column, do you notice pattern?

The difference is divisible by 3.

All done ☺