Tayelor & Kaitlyn (2) — Mattew & Jorge 0.5

Ramon & MiKayla 0.5 — Jose & Cameson (1.5)

Miranda & Jace 0.5 — Josue & John (2)

4.12

$3a + 7b$

$a = b \Rightarrow 10 \cdot a,\ 3a+7,\ 7a+3$

10, 17, 13, 20, 30, 16, 22, 24, ...

$n - 3 = 3a + 7b$

$n = 3(a+1) + 7b$

4.13

$2 + 4 + 6 + \dots + 2n = n \cdot (n+1)$

$4.2 \Rightarrow 1 + 2 + 3 + \dots + n = \frac{n \cdot (n+1)}{2} \iff 2 \cdot (1 + 2 + \dots + n) = n \cdot (n+1)$

or induction

4.16 (Bernoulli's ineq.)

$(1+x)(1+x)^n \geq 1 + n \cdot x\,(1+x)$ if $x > -1$

$(1+x)^{n+1} \geq (1+nx)(1+x) = 1 + x + nx + nx^2 \geq 1 + x + nx = 1 + x(1+n)$

$\vdash (1+x)^{n+1} \geq 1 + (n+1) \cdot x$

4.20 1, 2, ..., 6

1 < 3 > 2 < 4 < 6 > 5

4.23. (a) $a_1 = 1,\ a_2 = 3,\ n \geq 3$

$a_n = 2a_{n-1} - a_{n-2}$

$\vdash a_n = 2n - 1$, $\quad a_{n+1} = 2a_n - a_{n-1}$

$a_{n+1} = 2(n+1) - 1$

$a_{n+1} = 2(2n-1) - [2 \cdot (n-1) - 1]$

$= 4n - 2 - [2n - 3]$

$= 2n + 1$

$= 2(n+1) - 1$

4.24 $\forall n \in \mathbb{N}$

$1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n} < 3$

4.29

3x3

8	1	6
3	5	7
4	9	2

9	4	5
10	3	-2
6	9	7

$\vdash \forall n \in \mathbb{N}$ $n \geq 2$

there is an $n \times n$ anti-magic square

all of whose entries are positive numbers.

	5	6
8	3	5
3	1	2
	4	7

·	·	·
3	5	·
1	2	·

...