1 Opgave 1

- True, pick $m = n^2 + 1$
- True, pick $n = 0$
- True, pick $x = 3, y = 1$.
- False
- True
- True
- False

2 Opgave 2

- 1,2,5,6
- 2,4,5,6,7
- 1,3,4,6,7,8
- 3,4,5,6,7
- 2,3,4,5,7,8
- 1,4
- 2,3,4,5,6,7,8
- 1,2,3,4,5,6

3 Opgave 3

b)

$$(p \to q) \vee (\neg p \to q) \equiv (\neg p \vee q) \vee (p \vee q) \equiv (\neg p \vee p) \vee (q \vee q) \equiv \mathbf{T} \vee q \equiv \mathbf{T}$$

4 Opgave 4

Use floor division and modulo operator

- 1 | 66 | 1 | 66
- -2 | 21 | -2 | 21
- -5 | 2 | -5 | 2
- 11 | 8 | 11 | 8

5 Opgave 5

a)

$$a_2 = 6 \cdot 3 - 9 \cdot 1 = 9$$
$$a_3 = 6 \cdot 9 - 9 \cdot 3 = 54 - 27 = 27$$

$$a_4 = 6 \cdot 27 - 9 \cdot 9 = 81$$

b)

$$n = 0, a_0 = 3^0 = 1$$
$$n = 1, a_1 = 3^1 = 3$$

So the basis steps are correct.

c)

We now assume that $a_j = 3^j$ for any $j \leq k$

d)

Now we have to show that $a_{k+1} = 3^{k+1}$.

By using the formula, we can write:

$$a_{k+1} = 6a_k - 9 \cdot a_{k-1}$$

$$= 6 \cdot 3^k - 9 \cdot 3^{k-1} = 2 \cdot 3 \cdot 3^k - 3^2 \cdot 3^{k-1} = 3^{k+1}(2-1) = 3^{k+1}$$

6 Opgave 6

Let $A = \{1,2\}$, $B = \{2,3\}$.

$$A \cap B = \{2\}$$
$$A + B = \{1,2,2,3\}$$
$$A + B - (A \cap B) = \{1,2,2,3\} - \{2\} = \{1,2,3\}$$