Example 1.1, p. 5, #7

$A = \{2x : x \in \mathbb{Z},\ |x| < 4\} \stackrel{?}{=} \{-6, -4, -2, 0, 2, 4, 6\}$.

Is $-6 \in A$?

$-6 = 2 \cdot x$ where $x \in \mathbb{Z}$ and $|x| < 4$.

$-6 = 2 \cdot (-3)$ $\quad -3 \in \mathbb{Z}$ and $|-3| = 3 < 4$

so $-6 \in A$.

is $2 \in A$?

$2 = 2 \cdot 1$

$= 2 \cdot x$ where $x = 1 \in \mathbb{Z}$ and $|x| = |1| < 4$

So $2 \in A$.

$2x =$	-6	-4	-2	0	2	4	6
$x:$	-3	-2	-1	0	1	2	3

$|x| < 4$

$A = \{2x : x \in \mathbb{Z} \text{ and } |x| < 4\}$

$B = \{x : x \in \mathbb{Z} \text{ and } |x| < 4\}$

$B = \{-3, -2, -1, 0, 1, 2, 3\}$

$A = \{2x : x \in B\}$

$A = \{-6, -4, -2, 0, 2, 4, 6\}$.

Describe $A = \{7a+3b : a,b \in \mathbb{Z}\}$ (Example 1.2, p.6)

$A = \mathbb{Z}$.

a \ b	-2	-1	0	1	2	...
-2	-20	-13	-6	1	8	...
-1	-17	-10	-3	4		
0	-14	-7	0	7		
1	-11	-4				
2	-9					
⋮						

$A = \{n : n$ appears somewhere in this grid$\}$

trick to see this.

$7 \cdot 1 + 3(-2) = 1$

$1 \in A$.

$a = n$

$b = -2n$

$n \quad 7 \cdot n + 3n(-2) = n$

$7a + 3b = 7n - 6n = n$

$n \in A$.

$a = 5$

$b = 2$

$A = \{5a + 2b : a,b \in \mathbb{Z}\}$

Is $A = \mathbb{Z}$?

Problem 7: $\{x \in \mathbb{R} : x^2+5x=-6\}$: list elements of this set

answer = $\{-2, -3\}$

Find x so that $x^2+5x=-6$

$x^2+5x+6=0$

$(x+2)(x+3)=0$

so $x=-2$ or $x=-3$

set $= \{-2, -3\}$.

$A = \{x \in \mathbb{N} : x^2+5x=-6\}$.

List elements of A.

if $x \in \mathbb{N}$, then $x > 0$, so is $x^2+5x > 0$

so $x^2+5x \neq -6$.

$A = \emptyset$.

29. $|\{\{1\}, \{2, \{3,4\}\}, \emptyset\}| = 3$

$\{1\}$

$\{2, \{3,4\}\}$

$\emptyset$