

#1

1. $x=3 \rightarrow 3 \quad (3-1) \rightarrow 2$
 $x=2 \rightarrow 2 \quad (2-1) \rightarrow 1$
 $x=1 \rightarrow 1 \quad (1-1) \rightarrow 0$

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2. $x=3 \rightarrow 3 \quad (3-1) \rightarrow 2$
 $x=2 \rightarrow 2 \quad (2-1) \rightarrow 1$
 $x=1 \rightarrow 1 \quad (1-1) \rightarrow 0$
 $x=0 \rightarrow 0$

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3. $x=3 \rightarrow 3 + \text{fun}(2) \mid 6$
 $x=2 \rightarrow 2 + \text{fun}(1) \mid 3$
 $x=1 \rightarrow 1 + \text{fun}(0) \mid 1$

6

4. $3, 2 \Rightarrow 3$
 $3, 3 \rightarrow \text{fun}(3, 2) + 3 \mid 6$
 $3, 4 \rightarrow \text{fun}(3, 3) + 3 \mid 9$
 $3, 5 \rightarrow \text{fun}(3, 4) + 3 \mid 12$
 $3, 6 \rightarrow \text{fun}(3, 5) + 3 \mid 15$

$\text{fun}(3, 6) = 15$

5.

$\text{fun}(4, 2) = 4$

#2

1. ~~fun~~ 1 \rightarrow fun(0)
 2 \rightarrow fun(1)
 3 \rightarrow fun(2)
 4 \rightarrow fun(3)
 5 \rightarrow fun(4)

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2. 0 \rightarrow 0 \rightarrow end
 1 \rightarrow fun(0)
 2 \rightarrow fun(1)
 3 \rightarrow fun(2)
 4 \rightarrow fun(3)
 5 \rightarrow fun(4)

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3. ~~0~~ \rightarrow 0
~~2~~ \rightarrow 2 + fun(0)
~~4~~ \rightarrow 4 + fun(2)
~~6~~ \rightarrow 6 + fun(4)
 8 \rightarrow 8 + fun(6)

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4. fun(7, 2) = 2

5. ~~fun~~ 5, 2 \rightarrow 2
 5, 3 \rightarrow fun(5, 2) + 5
 5, 4 \rightarrow fun(5, 3) + 5
 5, 5 \rightarrow fun(5, 4) + 5

fun(5, 5) = 17

#3

1. $-1 \rightarrow -1$ | -1
 $2 \rightarrow 2 + \text{fun}(1)$ | 1
 $5 \rightarrow 5 + \text{fun}(2)$ | 6
 $8 \rightarrow 8 + \text{fun}(5)$ | 14

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2. ~~(1,7)~~ $(1,7) \rightarrow 7$ | 7
 $(2,8) \rightarrow \text{fun}(7) + 8$ | 15

15

3. $0 \rightarrow 0$ | 0
 $2 \rightarrow 2 + \text{fun}(0)$ | 2
 $4 \rightarrow 4 + \text{fun}(2)$ | 6
 $6 \rightarrow 6 + \text{fun}(4)$ | 12
 $8 \rightarrow 8 + \text{fun}(6)$ | 20

20

4. $0 \rightarrow 1$ | 1
 $1 \rightarrow 1 + \text{fun}(0) + \text{fun}(1)$ | 3
 $2 \rightarrow 2 + \text{fun}(1) + \text{fun}(0)$ | 6
 $3 \rightarrow 3 + \text{fun}(2) + \text{fun}(1)$ | 12
 $4 \rightarrow 4 + \text{fun}(3) + \text{fun}(2)$ | 22

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5. $5 \rightarrow 5 + \text{fun}(4) + \text{fun}(3)$ | 39

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#4

1. 6 $-1 \rightarrow 1$
 $0 \rightarrow 1$

$1 \rightarrow$	$1 + \text{fun}(0) + \text{fun}(-1)$	3
$2 \rightarrow$	$2 + \text{fun}(1) + \text{fun}(0)$	6
$3 \rightarrow$	$3 + \text{fun}(2) + \text{fun}(1)$	12
$4 \rightarrow$	$4 + \text{fun}(3) + \text{fun}(2)$	22
$5 \rightarrow$	$5 + \text{fun}(4) + \text{fun}(3)$	39
$6 \rightarrow$	$6 + \text{fun}(5) + \text{fun}(4)$	67

2. 67

3. $-2 \rightarrow 1$
 $-1 \rightarrow 1$
 $0 \rightarrow 1$

$1 \rightarrow$	$1 + g_0(-1) + g_0(-2)$	3
$2 \rightarrow$	$2 + g_0(0) + g_0(-1)$	4
$3 \rightarrow$	$3 + g_0(1) + g_0(0)$	7
$4 \rightarrow$	$4 + g_0(2) + g_0(1)$	11
$5 \rightarrow$	$5 + g_0(3) + g_0(2)$	16

16

4. 7

5. $-3 \rightarrow 1$
 $-2 \rightarrow 1$
 $-1 \rightarrow 1$
 $0 \rightarrow 1$
 $1 \rightarrow 1$
 $2 \rightarrow 1$
 $3 \rightarrow 1$
 $4 \rightarrow 1$
 $5 \rightarrow 1$
 $6 \rightarrow 1$

$1 \rightarrow$	$1 + \text{fly}(-3) + \text{fly}(-2)$	3
$2 \rightarrow$	$2 + \text{fly}(-1) + \text{fly}(0)$	5
$3 \rightarrow$	$3 + \text{fly}(0) + \text{fly}(1)$	8
$4 \rightarrow$	$4 + \text{fly}(1) + \text{fly}(2)$	13
$5 \rightarrow$	$5 + \text{fly}(2) + \text{fly}(3)$	23
$6 \rightarrow$	$6 + \text{fly}(3) + \text{fly}(4)$	43

fly(4) = 15

6. fly(5) = 23