62   Simplify (no proof)

(a)   0→1 | 1→2 | 2→3 | 3→4 | 4→5 | [0;..5]
§   0→1 | 1→2 | 2→3 | 3→4 | 4→5 | [0; 1; 2; 3; 4]
        =   0→1 | 1→2 | 2→3 | 3→4 | [0; 1; 2; 3; 5]
        =   0→1 | 1→2 | 2→3 | [0; 1; 2; 4; 5]
        =   0→1 | 1→2 | [0; 1; 3; 4; 5]
        =   0→1 | [0; 2; 3; 4; 5]
        =   [1; 2; 3; 4; 5]
        =   [1;..6]

(b)   (4→2 | [–3;..3]) 3
§   (4→2 | [–3;..3]) 3
        =   (4→2 | [–3; –2; –1; 0; 1; 2]) 3
        =   [–3; –2; –1; 0; 2; 2] 3
        =   0

(c)   ((3;2)→[10;..15] | 3→[5;..10] | [0;..5]) 3
§   ((3;2)→[10;..15] | 3→[5;..10] | [0;..5]) 3
        =   ((3;2)→[10;..15] | 3→[5;..10] | [0; 1; 2; 3; 4]) 3
        =   ((3;2)→[10;..15] | [0; 1; 2; [5;..10]; 4]) 3
        =   ((3;2)→[10;..15] | [0; 1; 2; [5; 6; 7; 8; 9]; 4]) 3
        =   [0; 1; 2; [5; 6; [10;..15]; 8; 9]; 4] 3
        =   [5; 6; [10;..15]; 8; 9]

(d)   ([0;..5] [3; 4]) 1
§   One way:
                    ([0;..5] [3; 4]) 1
        =   [[0;..5] 3; [0;..5] 4] 1
        =   [0;..5] 4
        =   4
        Another way:
                    ([0;..5] [3; 4]) 1
        =   [0;..5] ([3; 4] 1)
        =   [0;..5] 4
        =   4

(e)   (2;2)→"j" | [["abc"]; ["de"]; ["fghi"]]
§   Item 2 of [["abc"]; ["de"]; ["fghi"]] is ["fghi"] and its item 2 is "h" so replacing
        item 2;2 or [["abc"]; ["de"]; ["fghi"]] with "j" gives
                    [["abc"]; ["de"]; ["fgji"]]

(f)   #[nat]
§   1   because "A nonempty bunch of items is also an item." page 17
        or, informally
                    #[nat]
        =   #[0, 1, 2, 3, ...]
        =   #([0], [1], [2], [3], ...)
        =   #[0], #[1], #[2], #[3], ...
        =   1, 1, 1, 1, ...
        =   1

This is the sort of "proof" that mathematicians accept, but it's not a formal proof because the three dots mean "guess what goes here". Anyway, the question did not ask for proof.

(g)		#[*3]
§		#[*3]
	=	#[*nil*, 3, 3;3, 3;3;3, ...]
	=	#([*nil*], [3], [3;3], [3;3;3], ...)
	=	#[*nil*], #[3], #[3;3], #[3;3;3], ...
	=	0, 1, 2, 3, ...
	=	*nat*

Again, an informal "proof", but the question did not ask for proof.

(h)	[3; 4]: [3*4**int*]
§	4**int* = *int*; *int*; *int*; *int*
	3*4**int* = *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*
	[3*4**int*] = [*int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*; *int*]

which is all lists of 12 integers, and [3; 4] is not a list of 12 integers, so the answer is
⊥

(i)	[3; 4]: [3; *int*]
§	[3; *int*] is all lists of length 2 whose item 0 is 3 and whose item 1 is in *int* . The list [3; 4] is one of them, so the answer is

⊤

(j)		[3, 4; 5]: [2**int*]
§		[2**int*] is all lists of length 2 whose item whose items are both in *int* .
		[3, 4; 5]
	=	[3, (4; 5)]
	=	[3], [4; 5]

and [3] is not a list of length 2, so the answer is
⊥

(k)	[(3, 4); 5]: [2**int*]
§	[(3, 4); 5] = [3;5, 4;5] = [3; 5], [4; 5]

and both these lists are of length 2 and both items of each are in *int* so the answer is
⊤

(l)		[3; (4, 5); 6; (7, 8, 9)] ' [3; 4; (5, 6); (7, 8)]
§		[3; (4, 5); 6; (7, 8, 9)] ' [3; 4; (5, 6); (7, 8)]
	=	([3; 4; 6; 7], [3; 5; 6; 7], [3; 4; 6; 8], [3; 5; 6; 8], [3; 4; 6; 9], [3; 5; 6; 9])
		' ([3; 4; 5; 7], [3; 4; 6; 7], [3; 4; 5; 8], [3; 4; 6; 8])
	=	[3; 4; 6; 7], [3; 4; 6; 8]
	=	[3; 4; 6; (7, 8)]