RPN Stack Evaluation Problems

Problem 1: **3 5 + 2 ***

Step	Token	Operation	Stack After
1	3	Push 3	[3]
2	5	Push 5	[3, 5]
3	+	Pop 5,3 → Push 8	[8]
4	2	Push 2	[8, 2]
5	*	Pop 2,8 → Push 16	[16]

Final Answer: 16

Problem 2: 8 2 / 3 + 5 -

Step	Token	Operation	Stack After
1	8	Push 8	[8]
2	2	Push 2	[8, 2]
3	/	Pop 2,8 → Push 4	[4]
4	3	Push 3	[4, 3]
5	+	Pop 3,4 → Push 7	[7]
6	5	Push 5	[7, 5]
7	-	Pop 5,7 → Push 2	[2]

Final Answer: 2

Problem 3: 7 3 - 2 * 6 +

Step	Token	Operation	Stack After
1	7	Push 7	[7]
2	3	Push 3	[7, 3]
3	-	Pop 3,7 → Push 4	[4]
4	2	Push 2	[4, 2]
5	*	Pop 2,4 → Push 8	[8]
6	6	Push 6	[8, 6]
7	+	Pop 6,8 → Push 14	[14]

Final Answer: 14

Problem 4: 4 5 * 3 2 + / 6 -

Step	Token	Operation	Stack After
1	4	Push 4	[4]
2	5	Push 5	[4, 5]
3	*	Pop 5,4 → Push 20	[20]
4	3	Push 3	[20, 3]
5	2	Push 2	[20, 3, 2]
6	+	Pop 2,3 → Push 5	[20, 5]
7	/	Pop 5,20 → Push 4	[4]
8	6	Push 6	[4, 6]
9	-	Pop 6,4 → Push -2	[-2]

Final Answer: -2

Problem 5: 12 3 / 2 + 5 * 1 -

Step	Token	Operation	Stack After
1	12	Push 12	[12]
2	3	Push 3	[12, 3]
3	/	Pop 3,12 → Push 4	[4]
4	2	Push 2	[4, 2]
5	+	Pop 2,4 → Push 6	[6]
6	5	Push 5	[6, 5]
7	*	Pop 5,6 → Push 30	[30]
8	1	Push 1	[30, 1]
9	-	Pop 1,30 → Push 29	[29]

Final Answer: 29

Key Points:

- **Stack grows from left to right** (rightmost element is top of stack)
- **Operators pop two values**: second-to-top is left operand, top is right operand
- **For subtraction/division**: be careful about operand order (a b - means a - b)
- **Final stack should contain exactly one value** - that's your answer!