Global Coding Challenge   🞢 yashagarwal1999 ⌄

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Risk Trading

Whenever a company trades securities, there are various risks involved with the trade. Risk analysis is done for each trade in order to make the maximum profit from that trade. Each available trade can have the following properties:

- Probability that the trade will make a profit (p).
- Probability that the trade will make a loss (1-p).
- Potential profit of the trade (x).
- Potential loss of the trade (y).

Find and print the maximum expected amount of money the company can make by performing at most m of the n trades, given the values of m, n, x, y and p.

Input format

The first line contains two space-separated integers denoting the respective values n (the number of trades available) and m (the maximum number of trades allowed).

The second line contains p space-separated floating-point numbers describing the respective values of p_i, where each p_i denotes the probability that the ith transaction will result in a profit.

The third line contains x space-separated floating-point numbers describing the respective values of x_i, where each x_i denotes the potential profit of the ith transaction.

The fourth line contains y space-separated floating-point numbers describing the respective values of y_i, where each y_i denotes the potential loss of the ith transaction.

Constraints

- $1 \leq n, m \leq 100000$
- $0 \leq x, y \leq 100$
- $0 \leq p \leq 1$
- All x, y and p are floating-point numbers scaled to exactly two decimal places (i.e 2.45 format).

Output format

Print the maximum expected amount of money that can be made by performing at most m of the n available trades. Scale your answer to exactly 2 decimal places.

Examples

Example 1

Input

```
4 2

0.50 0.50 0.50 0.50

4.00 1.00 2.00 3.00

4.00 0.50 1.00 1.00
```

Output

```
1.50
```

i.e. There are n = 4 transactions available and we can perform at most m = 2 of them. We also know the probability that each transaction results in a profit is 0.5. If the third and the fourth transactions are performed, the expected amount of money made from these transactions is: (0.5 * 2.0) - ((1 - 0.5) * 1.0) + (0.5 * 3.0) - ((1 - 0.5) * 1.0) = 1.5. Since this is greater than all of the other possibilities we could calculate, 1.50 is our answer.

Example 2

Input

```
2 2

0.90 0.50

1.00 0.50

100.00 0.40
```

Output

```
0.05
```

i.e. There are n = 2 transactions available and we can perform at most m = 2 of them. We know that the probability the first transaction is profitable is 0.9 and for the second transaction this is 0.5. If the second transaction is performed, the expected amount of money made from this transaction is: (0.5 * 0.5) - ((1 - 0.5) * 0.4) = 0.05. Since this is greater than all of the other possibilities we could calculate, we print 0.05 as our answer.

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Your submission History for Question 4

	Timestamp	Commit ID	Language	# Tests Passed	# Tests Failed	# Tests Timed out	Build Status
+	10/19/2020, 10:45:45 PM	6b7fd2b	CPLUSPLUS	84	6	0	✓ Passed
+	10/19/2020, 10:44:38 PM	93598a1	CPLUSPLUS	42	48	0	⚠ Failed
+	10/19/2020, 10:42:47 PM	4aa9422	CPLUSPLUS	44	46	0	⚠ Failed
+	10/19/2020, 10:42:30 PM	ba19f77	CPLUSPLUS	36	54	0	⚠ Failed
+	10/19/2020, 10:19:10 PM	cc957f8	CPLUSPLUS	75	15	0	✓ Passed
+	10/19/2020, 10:16:42 PM	55edb6a	CPLUSPLUS	79	11	0	✓ Passed
+	10/19/2020, 10:14:51 PM	0f98459	CPLUSPLUS	81	9	0	✓ Passed
+	10/19/2020, 10:14:25 PM	bfa12ad	CPLUSPLUS	81	9	0	✓ Passed
+	10/19/2020, 10:13:34 PM	4479e4c	CPLUSPLUS	83	7	0	✓ Passed

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