Case Study: Titan Insurance Company

The Titan Insurance Company has just installed a new incentive payment scheme for its lift policy sales force. It wants to have an early view of the success or failure of the new scheme. Indications are that the sales force is selling more policies but sales always vary in an unpredictable pattern from month to month and it is not clear that the scheme has made a significant difference.

Life Insurance companies typically measure the monthly output of a salesperson as the total sum assured for the policies sold by that person during the month. For example, suppose salesperson X has, in the month, sold seven policies for which the sums assured are £1000, £2500, £3000, £5000, £10000, £35000. X's output for the month is the total of these sums assured, £61,500. Titan's new scheme is that the sales force receive low regular salaries but are paid large bonuses related to their output (i.e. to the total sum assured of policies sold by them). The scheme is expensive for the company but they are looking for sales increases which more than compensate. The agreement with the sales force is that if the scheme does not at least break even for the company, it will be abandoned after six months.

The scheme has now been in operation for four months. It has settled down after fluctuations in the first two months due to the changeover. To test the effectiveness of the scheme, Titan have taken a random sample of 30 salespeople measured their output in the penultimate month prior to changeover and then measured it in the fourth month after the changeover (they have deliberately chosen months not too close to the changeover). The outputs of the salespeople are shown in Table 1

Questions:

a. Describe the five per cent significance test you would apply to these data to determine whether new scheme has significantly raised outputs?
b. What conclusion does the test lead to?
c. What reservations have you about this result?(
d. Suppose it has been calculated that in order for Titan to break even, the average output must increase by £5000. If this figure is alternative hypothesis, what is:
    (i) The probability of a type 1 error?

    (ii) The probability of a type 2 error?

    (iii)The power of the test?

Table 1   Titan Insurance Output

Salesperson	Output (£000)	
	Old Scheme	New Scheme
1.	57	62
2.	103	122
3.	59	54
4.	75	82
5.	84	84
6.	73	86
7.	35	32
8.	110	104
9.	44	38
10.	82	107
11.	67	84
12.	64	85
13.	78	99
14.	53	39
15.	41	34
16.	39	58
17.	80	73
18.	87	53
19.	73	66
20.	65	78
21.	28	41
22.	62	71
23.	49	38
24.	84	95
25.	63	81
26.	77	58
27.	67	75
28.	101	94
29.	91	100
30.	50	68