33133:

Task. The following data represent the number of units of production per day turned out by 5 different workmen using different types of machines.

Workmen	Machine type			
	A	B	C	D
1	44	38	47	36
2	46	40	52	43
3	34	36	44	32
4	43	38	46	33
5	38	42	49	39

i) Test whether the mean productivity is the same for the four different machine types.

ii) Test whether 5 men differ with respect to mean productivity.

Solution. Define productivity as the number of units of production per day turned out by workman using a certain type of machines.

The mean productivity for the machine type A is $x_A = \frac{44+46+34+43+38}{5} = 41$.

The mean productivity for the machine type B is $x_B = \frac{38+40+36+38+42}{5} = 38.8$.

The mean productivity for the machine type C is $x_C = \frac{47+52+44+46+49}{5} = 47.6$.

The mean productivity for the machine type D is $x_D = \frac{36+43+32+33+39}{5} = 36.6$.

The mean productivity is not the same for the four different machine types.

The mean productivity of Workman 1 is $y_1 = \frac{44+38+47+36}{4} = 41.25$.

The mean productivity of Workman 2 is $y_2 = \frac{46+40+52+43}{4} = 45.25$.

The mean productivity of Workman 3 is $y_3 = \frac{34+36+44+32}{4} = 36.5$.

The mean productivity of Workman 4 is $y_4 = \frac{43+38+46+33}{4} = 40$.

The mean productivity of Workman 5 is $y_5 = \frac{38+42+49+39}{4} = 42$.

The general mean productivity $z = \frac{1}{20}(44 + 38 + 47 + 36 + 46 + 40 + 52 + 43 + 34 + 36 + 44 + 32 + 43 + 38 + 46 + 33 + 38 + 42 + 49 + 39) = 41$

All men differ with respect to mean productivity, the closest mean productivity to the general mean productivity has Workman 1.

Answer:

i)   the mean productivity is not the same for the four different machine types;
ii) All men differ with respect to mean productivity