



Problem:

The workers operate three machines. Let's denote by A_i the events, that during the day the machine with number i will require attention, $i = 1, 2, 3$. Express the following events through A_i : A – three machines have a defect during the day; B – at least one machine has a defect during the day; C – no machine has a defect during the day.

Solution:

A_1, A_2, A_3 – are events that the machines with numbers 1, 2, 3 respectively require attention. The event A – three machines have a defect during the day, means that all three events A_1, A_2 и A_3 take place, i.e., $A = A_1 \cap A_2 \cap A_3$. The event B – at least one machine has a defect during the day means that at least one of the events A_1, A_2, A_3 takes place, i.e., $B = (A_1 \cap A_2 \cap A_3) \cup (A_1 \cap A_2 \cap \overline{A_3}) \cup (A_1 \cap \overline{A_2} \cap A_3) \cup (\overline{A_1} \cap A_2 \cap A_3) \cup (A_1 \cap \overline{A_2} \cap \overline{A_3}) \cup (\overline{A_1} \cap \overline{A_2} \cap A_3) \cup (\overline{A_1} \cap A_2 \cap \overline{A_3})$. The event C – no machine has a defect during the day, means that none of the events A_1, A_2, A_3 takes place, i.e., $C = \overline{A_1} \cap \overline{A_2} \cap \overline{A_3}$.