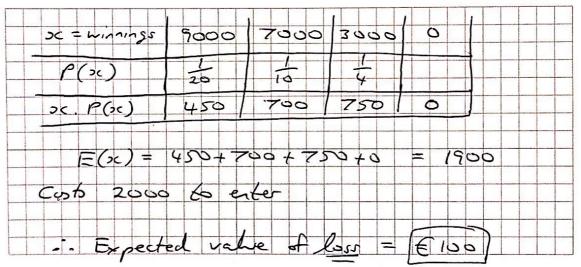
Answer all six questions from this section.

Question 1 (25 marks)

In a competition Mary has a probability of $\frac{1}{20}$ of winning, a probability of $\frac{1}{10}$ of finishing in second place, and a probability of $\frac{1}{4}$ of finishing in third place. If she wins the competition she gets \in 9000. If she comes second she gets \in 7000 and if she comes third she gets \in 3000. In all other cases she gets nothing. Each participant in the competition must pay \in 2000 to enter.

(a) Find the expected value of Mary's loss if she enters the competition.



(b) Each of the 3 prizes in the competition above is increased by the same amount $(\in x)$ but the entry fee is unchanged.

For example, if Mary wins the competition now, she would get $\in (9000 + x)$. Mary now expects to break even.

Find the value of x.

