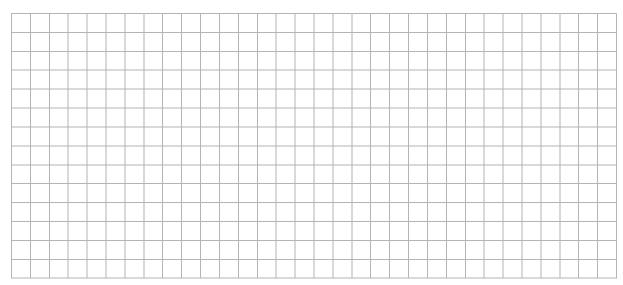**Question 1** (25 marks)

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 €9000. If she comes second she gets €7000 and if she comes third she gets €3000. In all other cases she gets nothing. Each participant in the competition must pay €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 (€x) but the entry fee is unchanged.
For example, if Mary wins the competition now, she would get €$(9000 + x)$.
Mary now expects to break even.
Find the value of x.