8. Let A_i, $i=\overline{1,3}$ be the event in which the i'th participant answers correctly ~~exactly~~ 7 questions, and the other answer any number of questions (this last part is sure to happen, therefore it has probability 1)

~~P(A For each trial there are 10 trials with probability $p_1=0,8$, $p_2=0,9$, $p_3=0,75$ where p_i is the probability that the~~

A trial here is answering a question. There are 10 independent trials. At each trial a contestant can be correct or not. For each participant, the probability that he is correct is: $p_1=0,8$, $p_2=0,9$, $p_3=0,75$. Therefore in calculating A_i, $i=\overline{1,3}$ we use the binomial model with different probability for each contestant.

$$P(A_1)=P(k=7)=C_{10}^{7}(0,8)^7\cdot(0,2)^3$$
$$P(A_2)=P(k=7)=C_{10}^{7}(0,9)^7(0,1)^3$$
$$P(A_3)=P(k=7)=C_{10}^{7}(0,75)^7(0,25)^3$$

We need to find $P(A_1\cup A_2\cup A_3)$ therefore we also need the probability of the intersection because the events are not m.e. (2 contestants can answer 7 questions).

$P(A_1\cap A_2)=P(A_1)P(A_2)$, $P(A_1\cap A_3)=P(A_1)P(A_3)$
$P(A_2\cap A_3)=P(A_2)P(A_3)$; $P(A_1\cap A_2\cap A_3)=P(A_1)P(A_2)P(A_3)$
because the contestants answer independently of each other (2)

$\Rightarrow P(A) = P(A_1 \cup A_2 \cup A_3)$

inclusion-exclusion principle

$$P(A_1) + P(A_2) + P(A_3)$$

$$\cancel{-(P(A_1) \cap P(A}$$

$$-(P(A_1 \cap A_2) + P(A_1 \cap A_3) + P(A_2 \cap A_3))$$

$$+ P(A_1 \cap A_2 \cap A_3)$$

$$\overset{(2)}{=} P(A_1) + P(A_2) + P(A_3)$$

$$-(P(A_1)P(A_2) + P(A_1)P(A_3) + P(A_2)P(A_3))$$

$$+ P(A_1)P(A_2)P(A_3)$$

octave

$$= 9,43559$$