Question 1

Part a

We have a total of 10 topics and need to pick 3, thus the amount of possible combinations is $\binom{10}{3} = 120$.

Part b

To find an expression for the probability that none of the n topics studied come up, I first find an expression for the opposite. That is at least 1 of the topics studied come up in the exam. To find that expression, I use the amount of combinations possible for 3 topics drawn out of 10. I then need to find the amount of combinations such that one or more questions out of n studied come up. This comes down to: $\binom{n}{3}$. Thus, the probability that one or more questions studied come up in the exam is:

$$\frac{\binom{n}{3}}{\binom{10}{3}} \tag{1}$$

We are looking for the opposite thus the probability that none of the n studied topics come up is:

$$1 - \frac{\binom{n}{3}}{\binom{10}{3}} \tag{2}$$

Part c

Part d

Part e

Part f

Part g