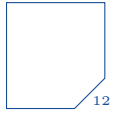2019–20 **MATH117 Mathematics for Architects – Homework 6** N. Course

DEADLINE: Friday 6 December 2019, 4:50pm

You must explain your answers to the following problems.

Exercise 26 (Conditional Probability). Harry Potter arrives at class either late or on time. He is then either shouted at or not. The probability that he turns up late is $\frac{2}{5}$. If he turns up late, the probability that he is shouted at is $\frac{7}{10}$. If he turns up on time, the probability that he is still shouted at for no particular reason is $\frac{1}{5}$.

You hear Harry being shouted at. What is the probability that he was late?

Exercise 27 (Conditional Probability). At Okan University, 70% of the lecturers like chocolate ice cream; and 40% of the lecturers like pistachio ice cream. Moreover 35% of the lecturers like chocolate ice cream AND strawberry ice cream; and 10% of the lecturers like strawberry ice cream AND pistachio ice cream.

(a). Dr Neil Course likes chocolate ice cream. What is the probability that he likes strawberry ice cream?

(b). Dr Neil Course likes chocolate ice cream. What is the probability that he likes pistachio ice cream?

(c). Dr Asuman Özer likes pistachio ice cream. What is the probability that she likes strawberry ice cream?

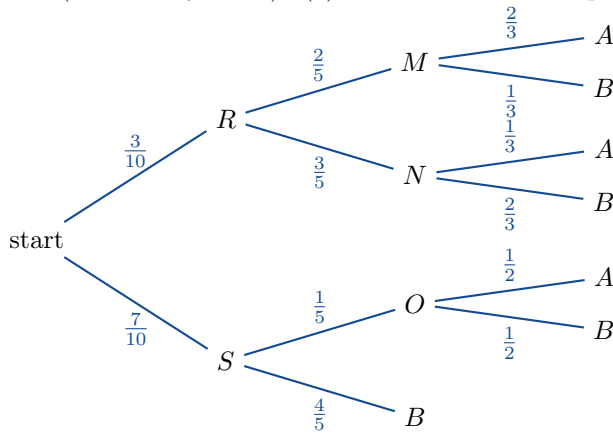**Exercise 28** (Graph Theory). How many edges do the following graphs have?

(a). K_n

(b). K_{nm}

(c). C_n

(d). W_n

Exercise 29 (Probability Trees). (a). Please consider the probability tree below. Use this to calculate $P(B)$.

(b). Ron Weasley has a bag with 7 blue sweets and 3 red sweets in it. He picks up a sweet at random from the bag, then puts it back in the bag. Then he picks a sweet at random from the bag and eats it. Finally he picks a third sweet at random. <u>Draw a probability tree</u> to represent this situation (include the probability of each branch, as I have done in part (a)).
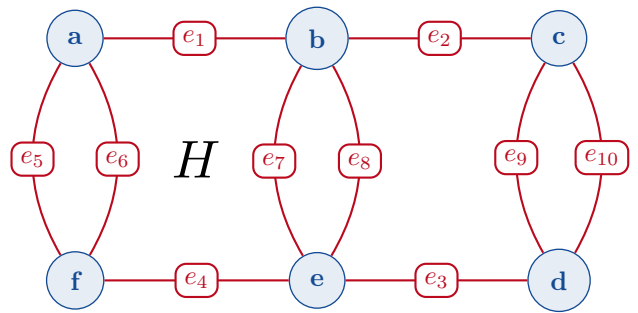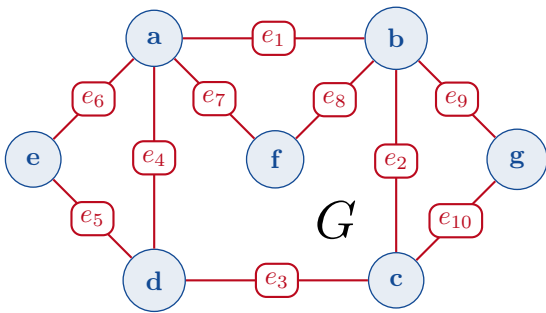
Exercise 30 (Graph Theory). Consider the two graphs above. For each graph, answer the question: Does this graph contain an Eulerian trail? If "yes", give an example of an Eulerian trail in that graph. If "no", explain how we know that it does not contain an Eulerian trail.