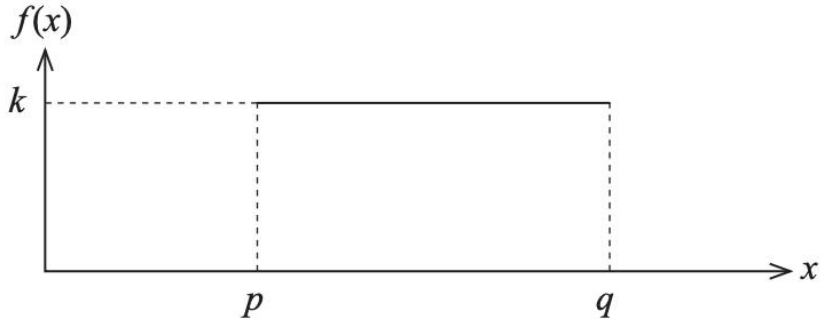
Question 2 **(10 marks)**

It takes Nahyun between 15 and 40 minutes to get to school each day, depending on traffic conditions. Nahyun leaves home for school at 8.00 am each school day. Let the random variable X be the time, in minutes after 8:00 am, that Nahyun arrives at school. The probability density function of X is shown below.



(a) What is the name of this type of distribution? (1 mark)

(b) Determine:

(i) the values of p, q and k (2 marks)

(ii) the expected value of X (1 mark)

(iii) the probability that Nahyun arrives at school before 8:25 am. (2 marks)

Nahyun will be late for her first class if she arrives at school after 8:28 am. Otherwise, she will not be late.

(c) If Nahyun is not late for her first class, what is the probability that she arrives after 8:25 am? (2 marks)

(d) If Nahyun only wants to be late for her first class at most 4% of the time, what time should she leave home, assuming the 15 to 40 minute travel time remains the same? (2 marks)