Let X be a random variable that's the number of edges, and we need to determine E[X]. For each possible edge *e*, we introduce an indicator random variable Y_e. That is, $Y_e = 1$ if the edge e exists and 0 if it does not. As the problem states, when given any set of 2 vertices {u, v}, the probability that the edge <u, v> exists is 1/10. Hence,

$$X = \sum_{e \in set\ of\ all\ possible\ edges} Y_e$$

$$E[X] = E[\sum_{e \in set\ of\ all\ possible\ edges} Y_e]$$

$$= \sum_{e \in set\ of\ all\ possible\ edges} E[Y_e]$$

$$= \sum_{e \in set\ of\ all\ possible\ edges} \Pr\{Y_e = 1\}$$

$$= \sum_{e \in set\ of\ all\ possible\ edges} \frac{1}{10}$$

$$= \frac{n(n-1)}{2} \cdot \frac{1}{10}$$

$$= \frac{n(n-1)}{20}$$

As a result, for a randomly sparse graph G with n vertices, we expect there to have $\frac{n(n-1)}{20}$ edges.