

The discrete random variable X has probability function

$$P(X = x) = k(16 - x^2) \text{ for } x = 0, 1, 2, 3$$

- a) Find the value of the constant k
 - b) Find $P(1 \leq X < 3)$
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- a) Work out the probabilities in terms of k

$$P(X = 0) = 16k$$

$$P(X = 1) = 15k$$

$$P(X = 2) = 12k$$

$$P(X = 3) = 7k$$

We know that the sum of all probabilities = 1

$$16k + 15k + 12k + 7k = 1$$

$$50k = 1$$

$$k = \frac{1}{50}$$

- b)

$$\text{Find } P(1 \leq X < 3) = P(X = 1) + P(X = 2)$$

$$= 15k + 12k$$

$$= 27k$$

$$= \frac{27}{50}$$