# Discrete random variables: expectation and variance

Answers

**Further Maths topic practice**

This topic online

| Q | Answer | Marks |
|---|---|---|
| 1 | **a)** 0.4 **b)** 2.7 | 3 |
| 2 | **a)** 1.3 **b)** 2.5 **c)** 0.9 | 4 |
| 3 | **a)** 3k + 4k + 5k + 6k = 18k = 1, so k = 1/18 **b)** $\frac{11}{18}$ **c)** E(X) = $\frac{25}{9}$, Var(X) = $\frac{95}{81}$ | 5 |
| 4 | **a)** a = 0.2, b = 0.4 **b)** 3.09 | 6 |
| 5 | **a)** 0.455 **b)** 0.55 | 5 |
| 6 | **a)** 1.29 **b)** 2.49 | 6 |
| 7 | p = 0.2, q = 0.3, r = 0.3 | 7 |
| 8 | **a)** $3 \times (1/6)^2 \times (5/6) = 15/216$ **b)** £0.787 ($\frac{85}{108}$) **c)** £42.59 **d)** 3.32 (£²) | 7 |
| 9 | **a)** 0.29 **b)** 0.16 **c)** 1.7 | 6 |
| 10 | **a)** E(X) = 1.6, Var(X) = 0.84 **b)** P(Y = 0) = 0.4, P(Y = 1) = 0.4, P(Y = 4) = 0.2<br>**c)** E(Y) = 1.2, and $0.84 + 0.6^2 = 1.2$ **d)** 2.16 **e)** 0.3 | 8 |
| 11 | **a)** k(1 + 1/2 + 1/3 + 1/6) = 2k = 1, so k = 1/2 **b)** E(X) = 2, E($X^2$) = 6, Var(X) = 2<br>**c)** $\frac{25}{36}$ | 7 |
| 12 | **a)** a = 0.1, b = 0.06 **b)** £24.60 **c)** 54.48 **d)** 0.306 | 10 |

Full worked solutions, written out by hand, are on the solutions sheet for this topic.


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