Exercise 2

Paper 2 style · Graphic display calculator

2 6 marks SL 4.8 ●●○ Typical

A basketball player scores a free throw with probability 0.4, independently of other throws. She takes 15 free throws. Let X be the number she scores.

(a) Find $P(X = 6)$. **[2]**

(b) Find the probability that she scores at least 8 times. **[2]**

(c) Write down $E(X)$ and find $\text{Var}(X)$. **[2]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

$X \sim B(15, 0.4)$ **(M1)**

$0.207 \ \ (0.206597\ldots)$ **A1**

Total 2 marks

MARKSCHEME (b)

$P(X \geq 8) = 1 - P(X \leq 7)$ **(M1)**

$0.213 \ \ (0.213103\ldots)$ **A1**

Total 2 marks

Note "At least 8": 7 is the last value excluded.

MARKSCHEME (c)

$E(X) = 6$ **A1**

$\mathrm{Var}(X) = 15 \times 0.4 \times 0.6 = 3.6$ **A1**

Total 2 marks