Marked example 3

Paper 2 style · Graphic display calculator

3 7 marks SL 4.8 ●●● Demanding

On any school day, the probability that a bus is late is 0.15, independently of other days. Consider 20 school days.

(a) Write down the expected number of days on which the bus is late. [1]

(b) Find the probability that the bus is late on exactly 2 days. [2]

(c) Find the probability that the bus is late on more than 4 days. [2]

(d) Find the least number of days n for which the probability that the bus is late at least once is greater than 0.99. [2]

MARKSCHEME (a)

$20 \times 0.15 = 3$ **A1**

Total 1 mark

MARKSCHEME (b)

$X \sim B(20, 0.15)$ **(M1)**

$0.229 \ \ (0.229338\ldots)$ **A1**

Total 2 marks

MARKSCHEME (c)

$P(X > 4) = 1 - P(X \leq 4)$ **(M1)**

$0.170 \ \ (0.170153\ldots)$ **A1**

Total 2 marks

MARKSCHEME (d)

$1 - 0.85^n > 0.99$ **(M1)**

$n = 29$ **A1**

Total 2 marks

Note $n > 28.3$: the least whole number is 29.

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. © 2026 Hence