Exercise 3

Paper 2 style · Graphic display calculator

3 7 marks SL 4.8 ●●● Demanding

The probability that a seed fails to germinate is 0.08, independently of other seeds. A gardener plants 25 seeds.

(a) Write down the expected number of seeds that fail to germinate. **[1]**

(b) Find the probability that exactly 3 seeds fail to germinate. **[2]**

(c) Find the probability that more than 4 seeds fail to germinate. **[2]**

(d) Find the least number of seeds n for which the probability that at least one fails to germinate is greater than 0.95. **[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)

$25 \times 0.08 = 2$ **A1**

Total 1 mark

MARKSCHEME (b)

$X \sim B(25, 0.08)$ **(M1)**

$0.188 \quad (0.188074\ldots)$ **A1**

Total 2 marks

MARKSCHEME (c)

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

$0.0451 \quad (0.0451435\ldots)$ **A1**

Total 2 marks

MARKSCHEME (d)

$1 - 0.92^n > 0.95$ **(M1)**

$n = 36$ **A1**

Total 2 marks

Note $n > 35.9$: the least whole number is 36.