



Mark: 8]



is toys. The probability that a toy is defective is 0.08. A random sample of  $n$  toys is taken. Find the probability that there are, at most, three defective toys.

(a) Find the expected number of defective toys. [2]

(b) Find the probability that there is at least one defective toy in the sample. [3]

(c) Given that there is at least one defective toy in the sample, find the probability that there are, at most, three defective toys. [3]

M

(a)

(b)

(c)

[Maximum mark: 8]



A factory makes toys. The probability that a toy is defective is 0.08. A random sample of 50 toys is tested.

- (a) Find the expected number of defective toys. [2]  
(b) Find the probability that there is at least one defective toy in the sample. [3]  
(c) Given that there is at least one defective toy in the sample, find the probability that there are, at most, three defective toys. [3]

$$\begin{aligned} \text{a) } E(x) &= np \\ &= 50(0.08) \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{b) } n &= 50 \\ p(x) &= 0.08 \\ P(x > 1) &= 0.985 \\ &\text{Binom cdf } (50, 0.08, 1, 50) \end{aligned}$$

$$\begin{aligned} \text{c) } P(x \leq 3 \mid x > 1) &= \frac{P(1 \leq x \leq 3)}{P(x > 1)} \\ &= \frac{0.410}{0.985} \\ &= 0.416 \end{aligned}$$

HW Questions

15 B #7

$$X = \{1, 2, 4\}$$

$$P(X=2) = 0.3$$

$$\bar{X} = 2.8$$

$$(1)(P(1)) + (2)(P(2)) + 4(P(4)) = 2.8$$

X	1	2	4
P(X=x)	a	0.3	b

$$\sum_1 (P(X=x)) = 1$$

$$a + b = 0.7$$

$$a + 0.6 + 4b = 2.8$$

$$a = 0.7 - b$$

$$0.7 - b + 0.6 + 4b = 2.8$$

$$1.3 + 3b = 2.8$$

$$a = 0.7 - 0.5$$

$$3b = 1.5$$

$$a = 0.2$$

$$b = 0.5$$

$$P(X=1) = 0.2$$



