

Binomial distribution

$$X \sim B(n, p)$$

$$P(X = r) = \binom{n}{r} p^r (1 - p)^{1-r}, r \geq 0$$

n is the number of trial

r is the number of times of success

p is the probability of a success

(1 - p) is the probability of a failure

GDC Skills

Casio

$$X \sim B(8, 0.31)$$

1. Find $P(X = 4)$

MENU \rightarrow 2 STAT \rightarrow F6 \rightarrow F5 DIST \rightarrow F5 BNM \rightarrow F2 Bpd

Data: Variable
X: 4
Numtrial: 8
P: 0.31

2. Find $P(X \leq 3)$

MENU \rightarrow 2 STAT \rightarrow F6 \rightarrow F5 DIST \rightarrow F5 BNM \rightarrow F2 Bcd

Data: Variable
X: 3
Numtrial: 8
P: 0.31

TI-84

$$X \sim B(8, 0.31)$$

1. Find $P(X = 4)$

2ND \rightarrow VARS \rightarrow binompdf \rightarrow (8, 0.31, 4)

2. Find $P(X \leq 3)$

2ND \rightarrow VARS \rightarrow binomcdf \rightarrow (8, 0.31, 3)

TI-nspire

$$X \sim B(8, 0.31)$$

1. Find $P(X = 4)$

Menu → 6: Statistics → 5: Distributions → D: Binomial Pdf

n: 8
p: 0.31
X: 4

2. Find $P(X \leq 3)$

Menu → 6: Statistics → 5: Distributions → E: Binomial Cdf

Data: Variable
n: 8
p: 0.31
Lower: 0
Upper: 3

$P(X = r)$

1. 10% of the electric light bulbs are defective at manufacture. If 20 bulbs are tested at random with each one being replaced before the next is chosen, find the probability that

(a) four are defective

(b) nine are defective

(c) 5 are not defective

$P(X \leq r)$, $P(X < r)$, $P(X \geq r)$ or $P(X > r)$

TI-84 GDC can only use binomcdf to calculate $P(X \leq r)$.

1. Given that 5% of the items assembled on a production line are faulty. A random sample of 20 items is selected with replacement. Find the probability that

(a) less than four will be faulty

(b) at most six will be faulty

Mean $E(X) = np$

Variance $\text{Var}(X) = np(1 - p)$

Variance is σ^2


Standard deviation is $\sigma = \sqrt{\text{Variance}}$

1. For $X \sim B(10, 0.44)$

(a) Find the mean

(b) Find the variance

(c) Find the standard deviation

2.  A forest has a large number of tall trees. The heights of the trees are normally distributed with a mean of 53 metres and a standard deviation of 8 metres. Trees are classified as giant trees if they are more than 60 metres tall.

(a) A tree is selected at random from the forest.

(i) Find the probability that this tree is a giant.

(ii) Given that this tree is a giant, find the probability that it is taller than 70 metres.

(b) Two trees are selected at random. Find the probability that they are both giant.

(c) 100 trees are selected at random.

(i) Find the expected number of these trees that are giants.

(ii) Find the probability that at least 25 of these trees are giant.
