EXERCISE 23D.3

1 Suppose $X \sim \text{B}(6, p)$. For each of the following cases:

- **i** find the mean and standard deviation of the X-distribution
- **ii** graph the distribution using a column graph
- **iii** comment on the shape of the distribution.

a $p = 0.5$ **b** $p = 0.2$ **c** $p = 0.8$

2 A coin is tossed 10 times and X is the number of heads which occur. Find the mean and variance of the X-distribution.

3 Bolts produced by a machine vary in quality. The probability that a given bolt is defective is 0.04. Random samples of 30 bolts are taken from the week's production.

a If X is the number of defective bolts in a sample, find the mean and standard deviation of the X-distribution.

b If Y is the number of non-defective bolts in a sample, find the mean and standard deviation of the Y-distribution.

4 A city restaurant knows that 13% of reservations are not honoured, which means the group does not arrive. Suppose the restaurant receives 30 reservations. Let X be the random variable of the number of groups that do not arrive. Find the mean and standard deviation of the X-distribution.

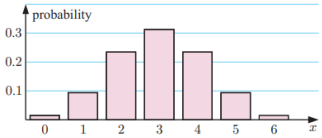
EXERCISE 23D.3

1 a i $\mu = 3,\ \sigma = 1.22$

ii

x_i	0	1	2	3
$P(x_i)$	0.0156	0.0938	0.2344	0.3125

x_i	4	5	6
$P(x_i)$	0.2344	0.0938	0.0156



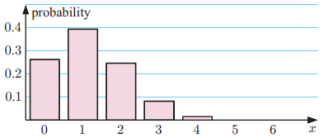
iii The distribution is bell-shaped.

b i $\mu = 1.2,\ \sigma = 0.980$

ii

x_i	0	1	2	3
$P(x_i)$	0.2621	0.3932	0.2458	0.0819

x_i	4	5	6
$P(x_i)$	0.0154	0.0015	0.0001



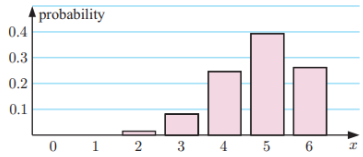
iii The distribution is positively skewed.

c i $\mu = 4.8,\ \sigma = 0.980$

ii

x_i	0	1	2	3
$P(x_i)$	0.0001	0.0015	0.0154	0.0819

x_i	4	5	6
$P(x_i)$	0.2458	0.3932	0.2621



iii The distribution is negatively skewed and is the exact reflection of **b**.

2 $\mu = 5,\ \sigma = 1.58$

3 a $\mu = 1.2,\ \sigma = 1.07$ **b** $\mu = 28.8,\ \sigma = 1.07$

4 $\mu = 3.9,\ \sigma \approx 1.84$