1 The random variables X and Y have independent distributions $X \sim \text{Po}(3)$ and $Y \sim \text{Po}(2)$ respectively.

(a) Find $\text{P}(2 < X < 5)$. [2]

(b) Find $\text{P}(X + Y > 2)$. [3]

(c) The total of 100 random values of X and 150 random values of Y is denoted by T.

Use a suitable approximating distribution to find $\text{P}(T < 560)$. [4]

6 The masses, in kilograms, of large and small bags of potatoes have the independent distributions N(2.5, 0.05) and N(0.8, 0.02) respectively.

(a) Find the probability that the total mass of a randomly chosen large bag of potatoes and a randomly chosen small bag of potatoes is more than 3.55 kg. [5]

(b) Find the probability that the mass of a randomly chosen large bag of potatoes is less than 3 times the mass of a randomly chosen small bag of potatoes. [5]

2 The random variable X has a normal distribution with mean 10 and standard deviation 3. The independent random variable Y has a Poisson distribution with mean 4.

(a) Find the standard deviation of $X+Y$. [3]

(b) Find the standard deviation of $5X-Y$. [3]

4 At an entertainment centre, the cost for using a particular video game is \$0.40 per minute. The number of minutes for which people use the video game has mean 15 and variance 9.

(a) Find the mean and variance of the amount people pay for using the video game. [3]

Each day, 35 people independently use the video game.

(b) Find the mean and variance of the total amount paid by 35 people. [3]