Transformation of Random Variables
Seatwork
30 marks

1 **6 marks**

The random variable X is defined such that $\mathrm{E}(X)=21.5$ and $\mathrm{Var}(X)=3$.

(a) Find $\mathrm{E}(1-10X)$.

[2]

(b) Find $\mathrm{Var}(5+2X)$.

[2]

Another random variable Y is defined such that $\mathrm{E}(Y)=20$. It is given that X and Y are independent.

(c) Find $\mathrm{E}(5+4X+3Y)$.

[2]

2 **6 marks**

The random variable X is defined such that $\mathrm{E}(5X)=40$ and $\mathrm{Var}(1+2X)=4$.

(a) Find $\mathrm{E}(X)$.

[2]

(b) Find $\mathrm{Var}(X)$.

[2]

Another random variable Y is defined such that $\mathrm{E}(Y)=20$. It is given that X and Y are independent.

(c) Find $\mathrm{E}(-X-Y)$.

[2]

3 **6 marks**

The random variable X is defined such that $\mathrm{E}(X) = -5$ and $\mathrm{Var}(X) = 16$.

(a) Find $\mathrm{E}(100 - X)$.

[2]

(b) Find $\mathrm{Var}(99 - 5X)$.

[2]

Another random variable Y is defined such that $\mathrm{Var}(Y) = 8$. It is given that X and Y are independent.

(c) Find $\mathrm{Var}(6X - 5Y)$.

[2]

4 **6 marks**

The random variable X is defined such that $\mathrm{E}(8 - 7X) = 29$ and $\mathrm{Var}(-7X) = 147$.

(a) Find $\mathrm{E}(X)$.

[2]

(b) Find $\mathrm{Var}(X)$.

[2]

Another random variable Y is defined such that $\mathrm{Var}(Y) = 4.5$. It is given that X and Y are independent.

(c) Find $\mathrm{Var}(10Y - 3X)$.

[2]

5 **6 marks**

The random variable X is defined such that $\mathrm{E}(X)=1.6$ and $\mathrm{Var}(X)=0.25$.

(a) Find $\mathrm{E}(5+4X)$.

[2]

(b) Find $\mathrm{Var}(4-5X)$.

[2]

Another random variable Y is defined such that $\mathrm{E}(Y)=-0.8$. It is given that X and Y are independent.

(c) Find $\mathrm{E}(3X-7Y)$.

[2]