

**SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**DEPARTMENT OF MATHEMATICS**

**MA215 Probability Theory**

**Tutorial 07**

**Set: Wednesday 19th October 2016; Hand in: Thursday 27th October 2016.**

1. Find the following values by using the Statistical Tables:
  - (a)  $F(4)$  and  $p(6)$  where  $F(x)$  and  $p(x)$  are the c.d.f. and p.m.f., respectively, of the Binomial random variable with parameters 13 and 0.25.
  - (b)  $F(18.4)$  and  $p(21)$  where  $F(x)$  and  $p(x)$  are the c.d.f. and p.m.f., respectively, of the Poisson random variable with parameter 15.9.
  - (c)  $F(-1.72)$ ,  $F(-1.723)$ ,  $F(0.48)$  and  $F(1.234)$  where  $F(x)$  is the c.d.f. of the standard normal random variable.
  - (d) Find  $x$  such that  $F(x) = 0.546$  where  $F(x)$  is the c.d.f. of the standard normal random variable. Similarly find  $y$  such that  $F(y) = 0.258$ .
2. Assume that heights of children in a certain age group average are normally distributed, i.e.  $X \sim N(\mu, \sigma^2)$ , where  $\mu = 58.4$  inches and with  $\sigma = 2.9$  inches.
  - (a) What proportion of children are between 57 and 61 inches tall?
  - (b) What is the number  $c$  such that 90% of the childrens height is less than  $c$ ?
3. Suppose  $X \sim N(\mu, \sigma^2)$  and let  $Y = \exp(X)$ .
  - (a) What are all possible values of  $Y$ ?
  - (b) Obtain the probability density function of  $Y$ .
4. Suppose  $X \sim N(\mu, \sigma^2)$  and let  $Y = aX + b$  where  $a$  and  $b$  are two constants and the constant  $a$  is not zero.
  - (a) What are all possible values of  $Y$ ?
  - (b) Obtain the probability density function of  $Y$ .
  - (c) Explain  $Y$  is also normally distributed. What are the parameters of  $Y$ ?
5. Suppose  $X \sim N(0, 1)$  and let  $Y = X^2$ .
  - (a) What are all possible values of  $Y$ ?
  - (b) Obtain the probability density function of  $Y$ .