

## Factorials - 20

Many questions in probability and statistics require an understanding of factorials and factorial notation.

Example:

We say that: 5 factorial =  $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ .

In general: k factorial =  $k! = k \times (k-1) \times (k-2) \times (k-3) \times \dots \times 4 \times 3 \times 2 \times 1$ .

note:  $0! = 1$ .

Answer the following questions:

1) Evaluate each expression:

- a)  $6!$                       b)  $9!$                       c)  $12!/8!$                       d)  $3! \times 4!$   
e)  $2 \times 4!$                       f)  $5! - 4!$                       g)  $8! / (4! \times 3!)$                       h)  $5! \times 6! / (4! \times 3!)$

2) Evaluate each expression:

- a)  $k! / (k-1)!$                       b)  $(n+1)! / (n-1)!$   
c)  $m! / (m+2)!$                       d)  $\{(k+2)!(k-1)!\} / \{(k+1)!k!\}$

3) Solve for k.

- a)  $k! = 5040$                       b)  $(k-2)! = 24$                       c)  $(k+1)! = 6(k-1)!$

Answers: 1)a) 720, b) 362,880, c) 11,880, d) 144, e) 48, f) 96, g) 280, h) 600, 2)a) k, b)  $(n+1) \times (n)$ , c)  $1 / \{(m+2) \times (m+1)\}$ , d)  $(k+2) / k$ , 3)a)  $k = 7$ , b)  $k = 6$ , c) Solve  $(k+1) \times k = 6$ ,  $k = 2$ .