

Chapter 13 / **Example 18**

# Using the central limit theorem

The number of emergency calls per hour to a hospital between 9.30am and 10.30am each day follows a Poisson distribution with parameter 6.3. Use the central limit theorem to find the probability that in 40 days the mean of the number of calls between 9.30am and 10.30am is less than 5.4.

$\bar{X} \sim N\left(6.3, \frac{6.3}{40}\right)$ . Find  $P(\bar{X} < 5.4)$ .

Press **MENU** 2 **STAT** to display the List Editor screen.

Press **F5** DIST **F1** NORM **F2** Ncd.

Select Data **F2** Var.

Enter  $-1 \times 10^{99}$  as the value of Lower using **x10<sup>x</sup>**, 5.4 as the value of Upper,  $\sqrt{\frac{6.3}{40}}$  as the value of  $\sigma$ , 6.3 as the value of  $\mu$  and the other items unchanged.

Enter the expression for  $\sigma$  directly, the GDC will perform the calculation for you.

```
Normal C.D
Data : Variable
Lower : -1×1099
Upper : 5.4
σ : 0.39686269
μ : 6.3
Save Res:None
[None] LIST
```

Use **▼** to navigate down to Execute and press **EXE** **□**

$P(\bar{X} < 5.4) = 0.117$ .

```
Normal C.D
p = 0.0116711
z:Low = -2.52×1099
z:Up = -2.2677868
```