

Chapter 14 / **Example 10**

# Calculating normal probabilities

Given that  $Z \sim N(0,1)$ , sketch the required area under the standard normal curve, then find the probability using your GDC:

- a**  $P(-2 < Z < 1)$       **b**  $P(Z < 1)$       **c**  $P(Z > -1.5)$   
**d**  $P(Z < 0)$       **e**  $P(|Z| > 0.8)$

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

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

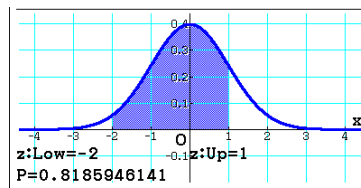
Select Data **F2** Var

Enter -2 as the value of Lower and 1 as the value of Upper and leave the other variables unchanged.

Use **▼** to navigate down to Execute.

Normal C.D  
 Data : Variable  
 Lower : -2  
 Upper : 1  
 $\sigma$  : 1  
 $\mu$  : 0  
 Save Res: None  
 List Var

Press **F6** DRAW



Press **EXIT** and **F1** CALC

$$P(-2 < Z < 1) = 0.819$$

Normal C.D  
 p = 0.81859461  
 z:Low=-2  
 z:Up=1

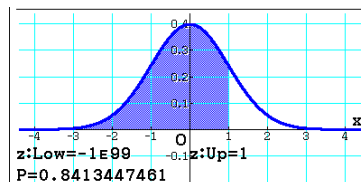
Press **EXIT**

Enter  $-1 \times 10^{99}$  as the Lower Bound using  **$\times 10^x$** , 1 as the Upper Bound and leave the other variables unchanged.

Use **▼** to navigate down to Execute.

Normal C.D  
 Data : Variable  
 Lower :  $-1 \times 10^{99}$   
 Upper : 1  
 $\sigma$  : 1  
 $\mu$  : 0  
 Save Res: None  
 List Var

Press **F6** DRAW



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Press **EXIT** and **F1** CALC

$$P(Z < 1) = 0.841$$

Normal C.D  
p = 0.84134474  
z: Low =  $-1 \times 10^9$   
z: Up = 1

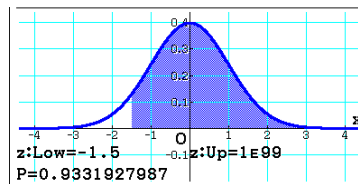
Press **EXIT**

Enter  $-1.5$  as the Lower Bound,  $1 \times 10^{99}$  as the Upper Bound using  **$\times 10^x$**  and leave the other variables unchanged.

Use  **$\blacktriangledown$**  to navigate down to Execute.

Normal C.D  
Data : Variable  
Lower :  $-1.5$   
Upper :  $1 \times 10^{99}$   
 $\sigma$  : 1  
 $\mu$  : 0  
Save Res: None  
**List** **Var**

Press **F6** DRAW



Press **EXIT** and **F1** CALC

$$P(Z > -1.5) = 0.933$$

Normal C.D  
p = 0.93319279  
z: Low =  $-1.5$   
z: Up =  $1 \times 10^{99}$

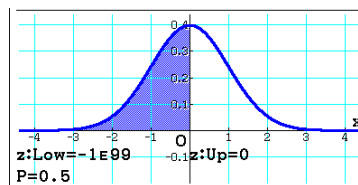
Press **EXIT**

Enter  $-1 \times 10^{99}$  as the Lower Bound using  **$\times 10^x$** , 0 as the Upper Bound and leave the other variables unchanged.

Use  **$\blacktriangledown$**  to navigate down to Execute.

Normal C.D  
Data : Variable  
Lower :  $-1 \times 10^{99}$   
Upper : 0  
 $\sigma$  : 1  
 $\mu$  : 0  
Save Res: None  
**List** **Var**

Press **F6** DRAW



$$P(Z < 0) = 0.5$$

Normal C.D  
p = 0.5  
z: Low =  $-1 \times 10^{99}$   
z: Up = 0

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Press **EXIT**

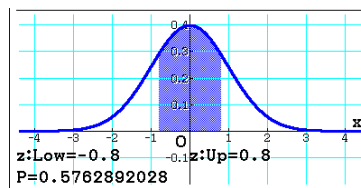
$$P(|Z| > 0.8) = 1 - P(-0.8 < Z < 0.8)$$

Enter -2 as the value of Lower and 1 as the value of Upper and leave the other variables unchanged.

Use  $\blacktriangledown$  to navigate down to Execute and press **EXE**.

Normal C.D  
 Data : Variable  
 Lower : -0.8  
 Upper : 0.8  
 $\sigma$  : 1  
 $\mu$  : 0  
 Save Res: None  
☐ List ☐ Var

Press **F6** DRAW



$$P(-0.8 < Z < 0.8) = 0.576$$

Normal C.D  
 p = 0.5762892  
 z:Low=-0.8  
 z:Up=0.8

Press **MENU** 1  $\frac{\text{RUN-MAT}}{\text{MODE}} \rightarrow \frac{\text{MODE}}{\text{MODE}}$  to display the Run-Matrix screen for arithmetical calculations.

Type 1 **=**

Press **VAR** **F3** STAT **F6** RESULT **F3** DIST **F1** p

Press **EXE**

The GDC displays the solution  $P(|Z| > 0.8) = 0.424$

1-p  
 0.4237107972  
☐  
 p x1Inv x1InvN x2InvN  $\blacktriangleright$