

# Understanding Normal Distribution.

This resource was written by Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the author and CASIO.

Select PRGM mode from the main menu by using the arrow keys to highlight the PRGM icon or pressing B.



This worksheet looks at how the calculator can be programmed to use the normal distribution, how we can calculate standardised scores and display the standard normal distribution curve and calculate the probability.

The programme to make it all work!

In PRGM enter in the name of the file and the type in the commands – you may need to consult the ‘quick access’ hints at the end of the program.

Filename: **Z-SCORE** (give a name to the program)

"NORMAL PROBS" **EXE**

Fix 4 **EXE**

Cls **EXE**

"ENTER MEAN(M)" **EXE**

? → M **EXE**

"ENTER STANDARD DEV(S)" **EXE**

? → S **EXE**

"ENTER LOWER LIMIT" **EXE**

? → A **EXE**

"ENTER UPPER LIMIT" **EXE**

? → B **EXE**

"YOUR FIRST Z~SCORE IS" **EXE**

(A-M) ÷ S → G **EXE**

G ◀

"YOUR SECOND Z~SCORE IS" **EXE**

(B-M) ÷ S → H **EXE**

H ◀

ViewWindow -4,4,1,0,.5,.1 **EXE**

Graph  $\int(1 \div (\sqrt{2\pi}))e^{(-1/2)X^2}, G, H$

```

=====Z-SCORE =====
"NORMAL PROBS"
Fix 4
Cls
"ENTER MEAN(M)"
?→M
"ENTER STANDARD
[TOP] [ETM] [SRC] [MENU] [SVBL]
    
```

```

=====Z-SCORE =====
DEV(S)"
?→S
"ENTER LOWER LIMIT"
?→A
"ENTER UPPER LIMIT"
?→B
[TOP] [ETM] [SRC] [MENU] [SVBL]
    
```

```

=====Z-SCORE =====
"YOUR FIRST
Z~SCORE IS"
(A-M)÷S→G
G
"YOUR SECOND
Z~SCORE IS"
[TOP] [ETM] [SRC] [MENU] [SVBL]
    
```

```

=====Z-SCORE =====
(B-M)÷S→H
H
ViewWindow -4,4,1,0,.
5,.1
Graph ∫(1÷(√(2π)))e<<
-1,2)X²).G,H
[TOP] [ETM] [SRC] [MENU] [SVBL]
    
```

## 'quick access' hints

**EXE** produces a broken arrow

“ **ALPHA**

Graph  $\int$ ( **SHIFT** **F4** **F5** **F5**

? **SHIFT** **VARS** **F4**

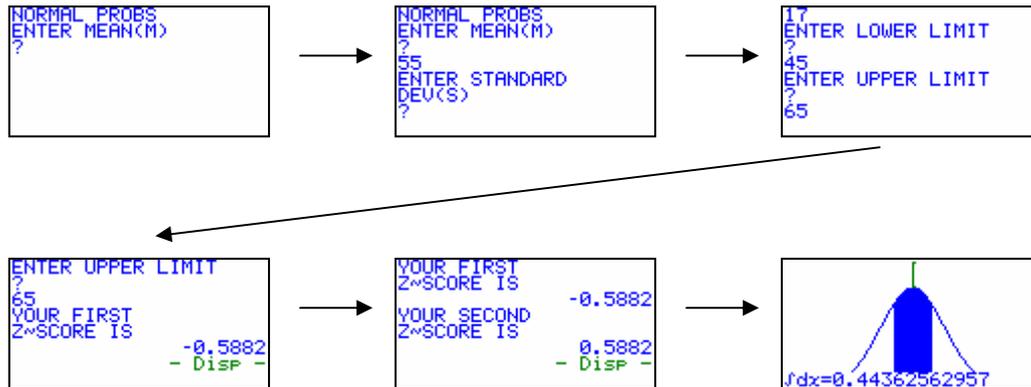
◀ **SHIFT** **VARS** **F5**

ViewWindow **SHIFT** **F3** **F1**

Cls **SHIFT** **F4** **F1**

**Example 1:** Calculate the probability of achieving a score between 45% and 65% in a test which has a mean (average) of 55% and a standard deviation of 17%. [Assume that the results from the test are Normally Distributed.]

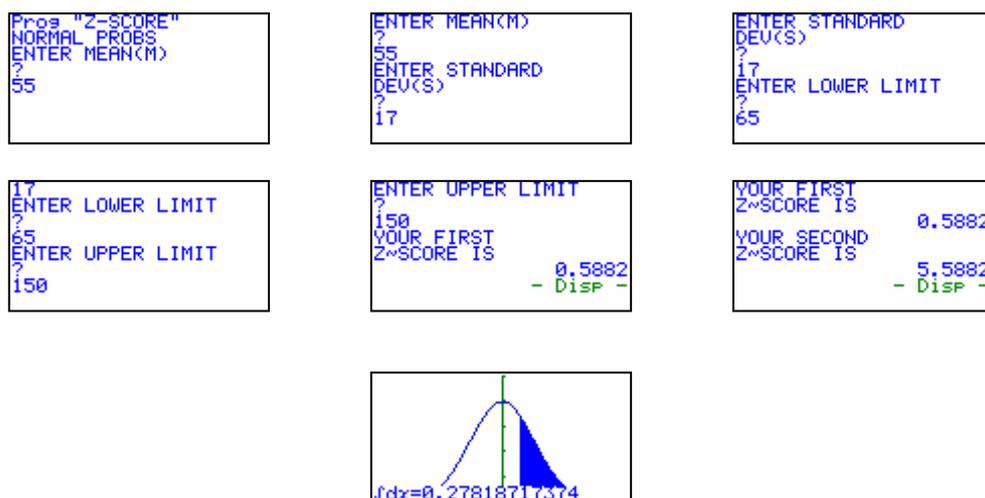
Activate the program, in **PRGM** mode, highlight the program **Z-SCORE** and either press **EXE** or **F1** to activate the



Displaying the normal distribution curve and the standardised Z-Scores and probability calculated.

Hence the required probability is approximately 44.36%

**Example 2:** Calculate the probability of achieving a score greater than 65% in a test which has a mean (average) of 55% and a standard deviation of 17%. [Assume that the results from the test are Normally Distributed.]



Hence the required probability is approximately 27.82%

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