

Chapter 14 / Example 3

Expected value

Calculating the expected value with a GDC

A random variable X represents the number of sixes obtained when a dice was rolled three times (which is also the number of sixes when three dice are rolled once). Here is the probability distribution.

x	1	2	3	4
$P(X = x)$	$\frac{125}{216}$	$\frac{25}{72}$	$\frac{5}{72}$	$\frac{1}{216}$

Find the expected value of X .

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

Type the numbers 1, 2, 3, 4 in the first column.

Press **EXE** after each number to move to the next cell.

Note: If the list contains other numbers, you can clear it by pressing **F4** DEL-ALL.

	List 1	List 2	List 3	List 4
SUB				
1	1			
2	2			
3	3			
4	4			

Press **▶** to move to the next column.

Enter the probabilities of each number in the second column.

The GDC will convert the fractions to decimals.

	List 1	List 2	List 3	List 4
SUB				
1	1	0.5787		
2	2	0.3472		
3	3	0.0694		
4	4	4.6E-3		

To calculate $E(X)$ from the table

Press **F2** CALC **F6** SET

Navigate down to 1Var Freq and press **F2** LIST. Type 2 and press **EXE**.

Press **EXIT**.

1Var	XList	:List1
1Var	Freq	:List2
2Var	XList	:List1
2Var	YList	:List2
2Var	Freq	:1

Press **F1** 1-VAR

The expected value of x is the mean, shown as \bar{x} .

$E(X) = 1.5$.

1-Variable	
\bar{x}	=1.5
Σx	=1.5
Σx^2	=2.666666666
σx	=0.64549722
sx	=
n	=1