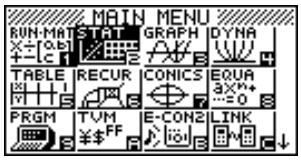
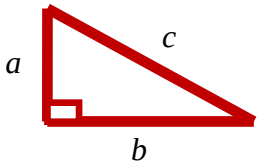
Pythagorean triples.



Select the **STAT** icon from the **Main Menu** by using the arrow keys to highlight the **STAT** icon followed by [**EXE**] or by pressing the [**2**] key.

Below is an example of a list of some Pythagorean triples, whole numbers that obey the rule: $a^2 + b^2 = c^2$ for a right-angled triangle.

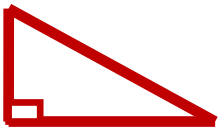


Pythagorean Triples

(3, 4, 5)	(5, 12, 13)	(7, 24, 25)	(8, 15, 17)
(9, 40, 41)	(11, 60, 61)	(12, 35, 37)	(13, 84, 85)
(16, 63, 65)	(20, 21, 29)	(28, 45, 53)	(33, 56, 65)
(36, 77, 85)	(39, 80, 89)	(48, 55, 73)	(65, 72, 97)

Questions:

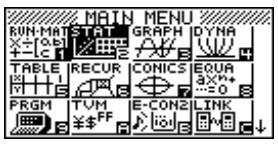
1. What Pythagorean triples can be generated, such that a right angled triangle has the sides: $n^2 + 1$, $n^2 - 1$ and $2n$ respectively?
   Which sides of the right angled triangle will $n^2 + 1$, $n^2 - 1$ and $2n$ be placed? How do you know?



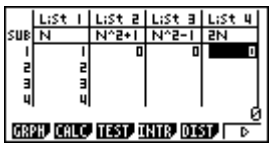
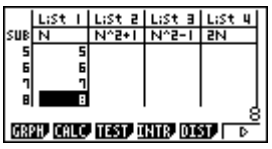
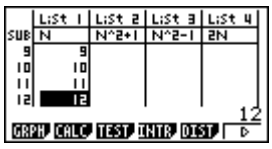
2. Complete the table below:

n =	$n^2 + 1$	$n^2 - 1$	$2n$
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
…	…	…	…

These Pythagorean triples can be calculated via the **STAT** icon.

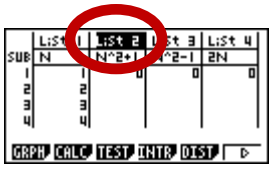
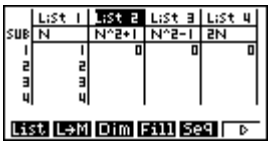


Firstly, give each of the List spaces 1, 2, 3 and 4 a header (**SUB** title), using the [**ALPHA**] keys and then enter in the **N** values, into **List 1**, the numbers 1 ~ 12.

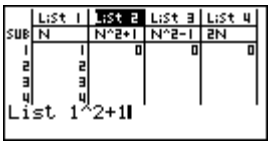




Now, populate List spaces 2, 3 and 4 by entering in the instructions, when the 'Cursor' is highlighting the respective **List** area (see circled area below).

For **List 2**:

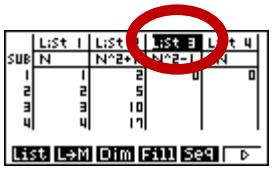
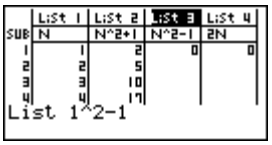



[**OPTN**] then [**F1**] for List.



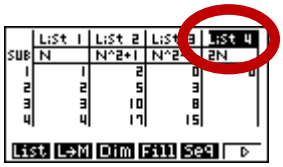
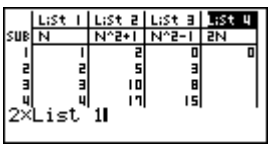
[**F1**] for List to appear on the screen. Then [**1**], [^], [**2**], [+], [**1**] and press [**EXE**] to populate the List 2 space.

For **List 3**:

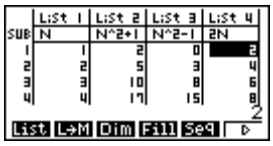
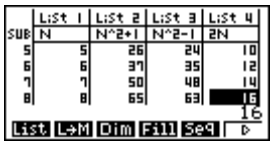
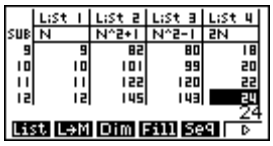
Then press [**EXE**] to populate the list 3 space.

For **List 4**:

Then press [**EXE**] to populate the list 4 space.

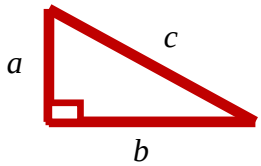
The completed set of 12 Pythagorean triples, for $1 \leq n \leq 12$.

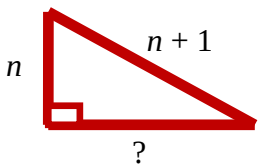




Set N =		Set N =		Set N =		Set N =	
1	2, 0, 2	**4**	17, 15, 8	**7**	50, 48, 14	**10**	101, 99, 20
2	5, 4, 3	**5**	26, 24, 10	**8**	65, 63, 16	**11**	122, 120, 22
3	10, 8, 6	**6**	37, 35, 12	**9**	82, 80, 18	**12**	145, 143, 24

Questions:

1. Can you generate Pythagorean triples where a and c differ by 1?
   That is, $a = n$ and $c = n + 1$. What is the value of side b in this case?





2. Can you generate Pythagorean triples where a and c differ by 2?

3. Can you generate Pythagorean triples where a and c differ by 3?

4. Now generalise, can you generate Pythagorean triples, where a and c differ by m? [**Note: m < n.**]