CSC130 Name: _____
Assignment 4 Section: _____

This homework covers the topics of Loops, Logic, Methods, Classes, and Unit Tests.

Create a program similar to the attached example. It should include a 'main.java', 'myMath.java' and 'myUnitTests.java'

Choose 4 of the following. All 4 functions should be contained in 'myMath.java' and unit tests in myUnitTests.java'

1. Create a function called isTriangleShape.
   It should take in 3 integers and test that the sum of the two smaller numbers is larger than the 3rd.
   If the test passes the result should be true, and if it fails the result should be false.
   Create the following UnitTest cases for this function:

   - a=5, b=2, c=4 should result in True.
   - a=1, b=2, c=3 should result in False.

2. Create a function called triangleNumber. This function should give the nth triangle number where n is the number given. Triangle numbers are defined by summing up n counting numbers.

   - $t(1) = 1 = 1$
   - $t(2) = 1 + 2 = 3$
   - $t(3) = 1 + 2 + 3 = 6$

   Create the following UnitTest cases for this function:

   - a=2 should return 3
   - a=11 should return 66

3. Create a function called squareNumber which gives the square of a number.

   - $s(1) = 1 = 1$
   - $s(2) = 2^2 = 4$
   - $s(3) = 3^2 = 9$

   Create the following UnitTest cases for this function:

   - a=13 should return 169
   - a=-4 should return 16

4. Create a function called isSquareNumber.
   It should take in a number and test if that number is a perfect square.
   If the test passes the result should be true, and if it fails the result should be false.
   Create the following UnitTest cases for this function:

   - a=16 should result in True.
   - a=8 should result in False.

5. Create a function called isTriangleNumber.
   It should take in a number and test if that number is a triangle number.
   If the test passes the result should be true, and if it fails the result should be false.
   To test if something if a triangle number subtract the counting numbers in order.
   If at some point your number is 0 then the number is a triangle number.
   If at some point you have a negative number you do not have a triangle number.
   If your value is still positive the process needs to continue.

   isTriangleNumber(45):

$$\begin{aligned} 45 - 1 &= 44 \\ 44 - 2 &= 42 \\ 42 - 3 &= 39 \\ 39 - 4 &= 35 \\ 35 - 5 &= 30 \\ 30 - 6 &= 24 \\ 24 - 7 &= 17 \\ 17 - 8 &= 9 \\ 9 - 9 &= 0 \end{aligned}$$

   isTriangleNumber(45)=true

   isTriangleNumber(9):

$$\begin{aligned} 9 - 1 &= 8 \\ 8 - 2 &= 6 \\ 6 - 3 &= 3 \\ 3 - 4 &= -1 \end{aligned}$$

   isTriangleNumber(9)=false Create the following UnitTest cases for this function:

   - a=45 should result in True.
   - a=9 should result in False.