 Triangle investigation

Definitions

Write definitions for each of the following. Make sure they are in your own words. You may use diagrams to aid your explanations.

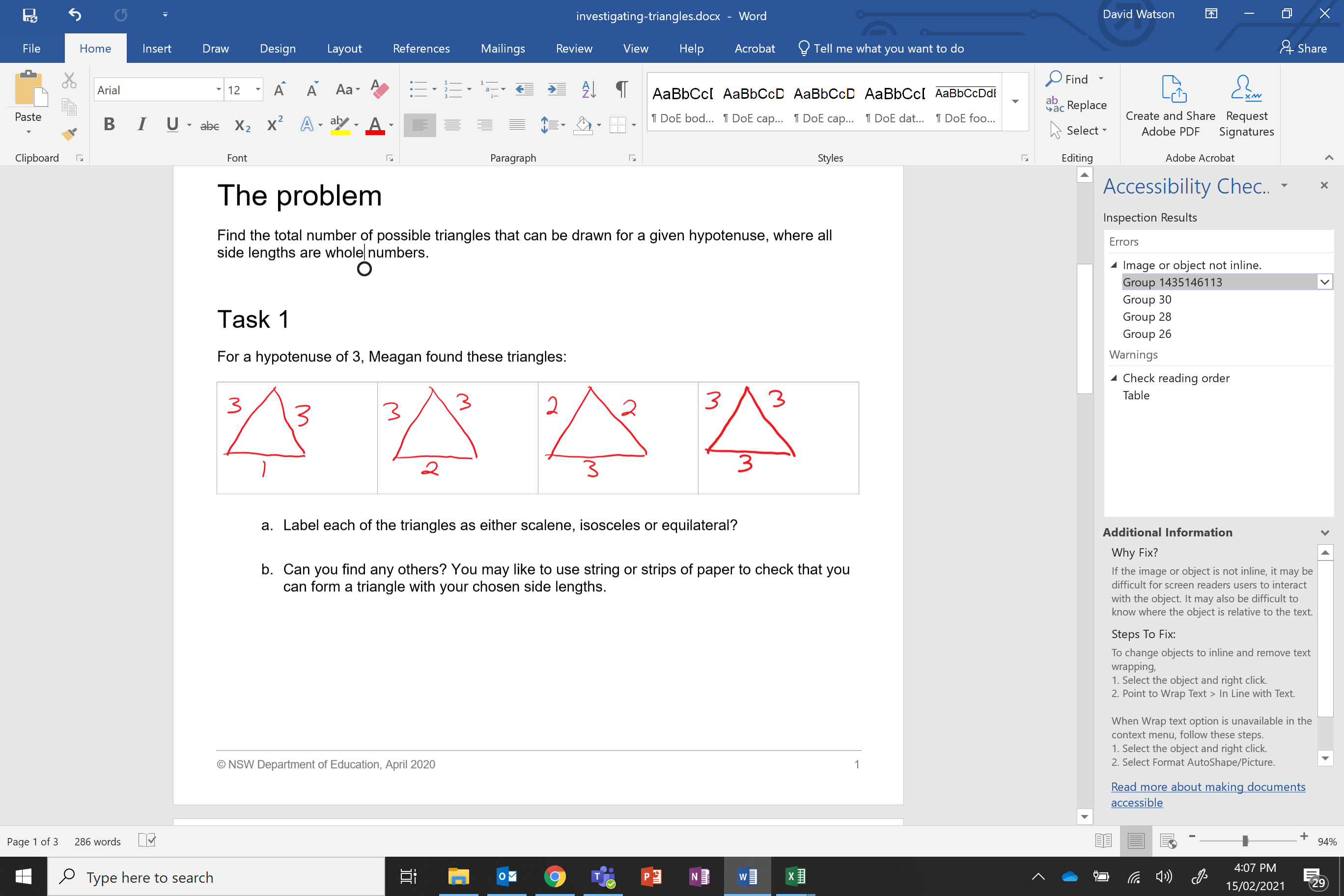
* Triangle
* Hypotenuse
* Equilateral
* Isosceles
* Scalene

The problem

Find the total number of possible triangles that can be drawn for a given hypotenuse, where all side lengths are whole numbers.

Task 1

For a hypotenuse of 3, Meagan found these triangles:



* 1. Label each of the triangles as either scalene, isosceles or equilateral?
  2. Can you find any others? You may like to use string or strips of paper to check that you can form a triangle with your chosen side lengths.

Task 2

Use the table to organise your results. Start with a hypotenuse of 1, how many different triangles can you draw?

| Hypotenuse | Equilateral | Isosceles | Scalene | Total |
| --- | --- | --- | --- | --- |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
| 8 |  |  |  |  |
| 9 |  |  |  |  |
| 10 |  |  |  |  |

Task 3

1. What did you notice whilst you were finding the number of triangles for each hypotenuse? What method did you use to make sure you had found all the triangles?
2. Can you find any patterns in your table that would help you to predict how many triangles there are with a hypotenuse of 11? 12? 15?
3. Use patterns to find how many triangles there are with a hypotenuse of 11, 12 or 15. Explain or show how you came up with your answers.

Outcomes

* MA4-1WM communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols
* MA4-2WM applies appropriate mathematical techniques to solve problems
* MA4-3WM recognises and explains mathematical relationships using reasoning
* MA4-8NA generalises number properties to operate with algebraic expressions
* MA3-15MG manipulates, classifies and draws two-dimensional shapes, including equilateral, isosceles and scalene triangles, and describes their properties