

Sir Trap's Pattern

Once upon a time, in far away Triangleleland, a young knight, Sir Trap, from the land of the Zoids, was seeking passage through a tunnel in the great mountain, Obtuse. When Sir Trap got to the entrance, he found it was guarded by a fierce dragon, whose name was CPCTC. CPCTC told Sir Trap that he could pass through only if he could answer the following questions within 30 minutes. Being a good mathematician, Sir Trap was able to answer, after only a couple of minutes and was able to go on his way. Here are the questions he had to answer. See if you can figure out the answers within the allotted 30 minutes.

Here is a pattern made of dots.

```
      *           *           *           *
        * *       * *       * *       * *
          * * *   * * *   * * *   * * *
            * * * * * * * * * * * * * *
              * * * * * * * * * * * * *
                * * * * * * * * * * * *
                  * * * * * * * * * * *
                    * * * * * * * * * *
                      * * * * * * * * *
                        * * * * * * * *
                          * * * * * *
                            * * * * *
                              * * * *
                                * * *
                                  * *
                                    *
```

1. How many dots will be in the next set?
2. How many dots in the 10th set?
3. How many in the 100th set?
4. How many in the 1000th set?

Core Content:

MA-M 1.1.1, 1.1.5, 1.1.6, 1.2.1, 1.2.5, 1.3.2, 4.1.14.1.2, 4.2.1, 4.2.3, 4.2.4, 4.2.