

Answer on Question #75318 – Math – Algebra

Question

Your manager asks you to work on the design of a 10-speed drilling machine which has a common ratio of 1.38. The lowest speed is to be set at 200rev/min.

- Work out all the speeds.
- Plot them in a chart.
- Write down the general expression for the geometric progression (GP) which you have used.
- If the design is changed to a 12 speed, calculate the highest speed using the GP formula.

Solution

Let the GP of n terms be given by $a, ar, ar^2, \dots, ar^{n-1}$.

The first term $a = 200 \text{ rev/min}$

The common ratio $r = 1.38$

The second term is $ar = (200)(1.38) = 276$

The third term is $ar^2 = (200)(1.38)^2 = 380.88$

The fourth term is $ar^3 = (200)(1.38)^3 = 525.6144$

The fifth term is $ar^4 = (200)(1.38)^4 = 725.347872$

The sixth term is $ar^5 = (200)(1.38)^5 = 1000.98006336$

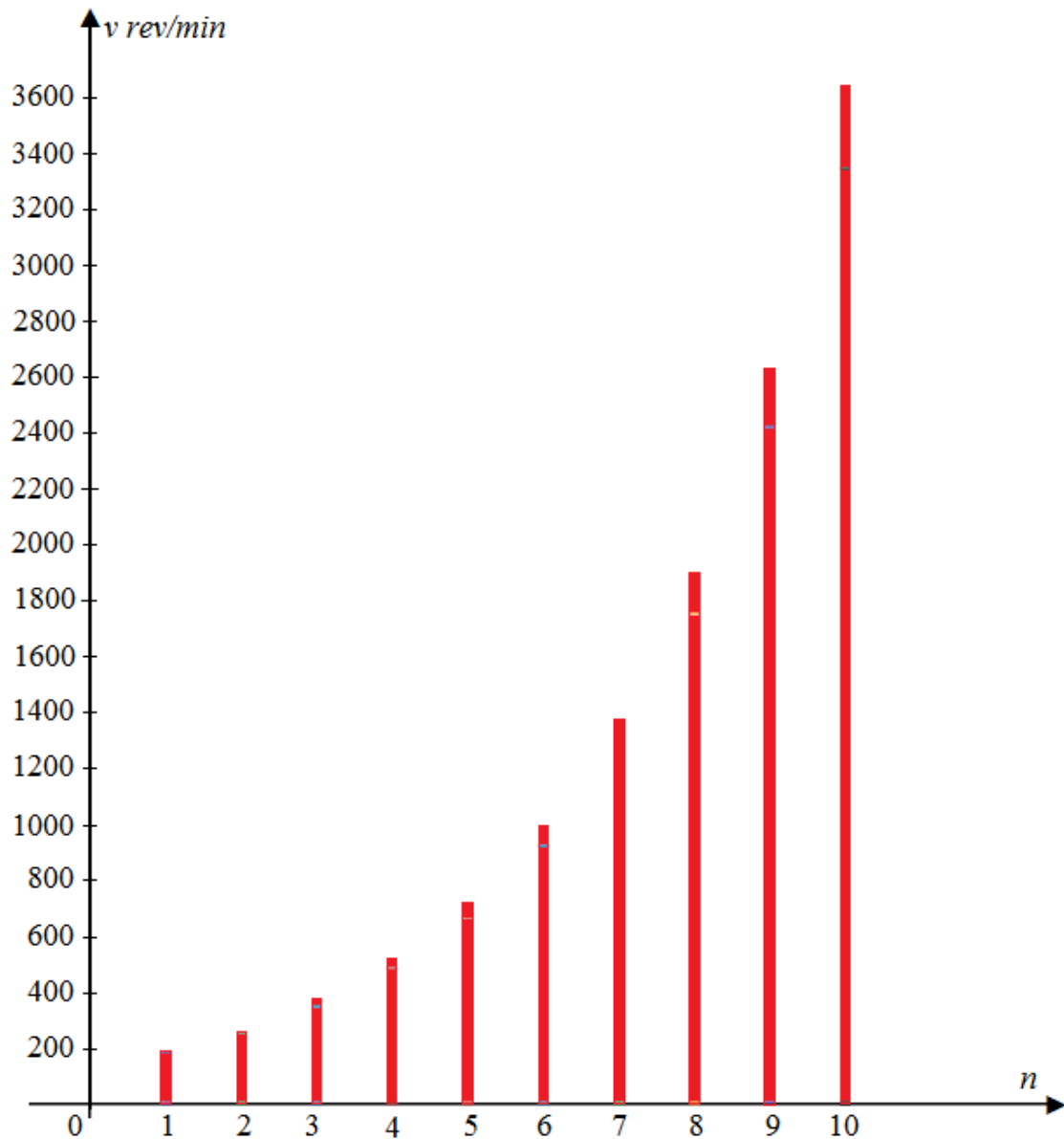
The seventh term is $ar^6 = (200)(1.38)^6 = 1381.3524874368$

The eighth term is $ar^7 = (200)(1.38)^7 = 1906.266432662784$

The ninth term is $ar^8 = (200)(1.38)^8 = 2630.64767707464192$

The tenth term is $ar^9 = (200)(1.38)^9 = 3630.2937943630058496$

Hence, correct to the nearest whole number, the 10 speeds of drilling machine are 200, 276, 381, 526, 725, 1001, 1381, 1906, 2631 and 3630 *rev/min*



If the first term of GP is a and the common ratio is r , then the n^{th} term is ar^{n-1} .

If the design is changed to a 12 speed, calculate the highest speed using the GP formula

$$ar^{12-1} = (200)(1.38)^{11} = 6913.531501984908339978$$

Correct to the nearest whole number, the highest (twelfth) speed of drilling machine is 6914 rev/min .

Answer provided by <https://www.AssignmentExpert.com>