

Homework questions

Qtt #1 $u_1 = 4$, $S_{30} = 1425$
find d

$$S_n = \frac{n}{2}(4 + (n-1)d)$$

$$1425 = \frac{30}{2}(2(4) + (29)d)$$

$$1425 = 15(8 + 29d)$$

$$1425 = 120 + 435d$$

$$435d = 1305$$

$$d = 3$$

#3 $u_1 = -30$, $d = 3.5$

$$S_n = \frac{n}{2}(2(-30) + (n-1)3.5)$$

$$S_n = \frac{n}{2}(-60 + (n-1)3.5)$$

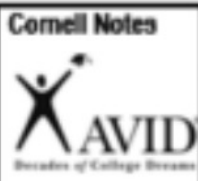
$$105 = \frac{n}{2}(\underline{-60} + 3.5n - \underline{3.5})$$

$$210 = n(-63.5 + 3.5n)$$

$$210 = -63.5n + 3.5n^2$$

use quadratic equation

$$n = 21$$



Topic/Objective: 6.6 Geometric Series

Name: _____
Class/Period: 4
Date: 4/24/16

Essential Question: How does a Geometric Series differ from an arithmetic series?

Questions:

Notes: Just as an arithmetic series is the sum of its terms, a Geometric series is the sum of the terms of a Geometric sequence.

$$S_n = u_1 + u_1 r + u_1 r^2 + u_1 r^3 + \dots + u_1 r^{n-1}$$

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Math magic happens p. 175

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so that

YOU CAN FIND THE SUM OF THE FIRST n TERMS OF A GEO SERIES BY USING:

$$S_n = \frac{u_1(r^n - 1)}{r - 1} \quad \leftarrow \begin{matrix} \text{use} \\ \text{when} \\ r > 1 \end{matrix}$$

or

$$S_n = \frac{u_1(1 - r^n)}{1 - r}$$

Questions:

Notes:

Ex) Calculate the first 12 terms of the series $1 + 3 + 9 + \dots$

$$u_1 = 1, r = 3$$

$$S_{12} = \frac{1(3^{12} - 1)}{3 - 1} = 265,720$$

Ex) Calculate the value of S_{20} of the series $3 - 6 + 12 - 24 + \dots$

$$u_1 = 3, r = -2$$

$$r = \frac{-6}{3} = -2 \quad r = \frac{12}{-6} = -2$$

$$S_n = \frac{u_1(1 - r^n)}{1 - r}$$

$$S_{20} = \frac{3(1 - (-2)^{20})}{1 - (-2)} = 1048577$$

$$S_{12} = 10 S_3$$

$$u_1 = 5, d = \underline{\quad} \quad S_{20} = \underline{\quad}$$

$$S_n = \frac{n}{2}(2u_1 + (n-1)d) \quad \left[\frac{3}{2}(2(5) + (3-1)d) \right]$$

$$\frac{12}{2}(2(5) + (11)d) = 10 \left[\frac{3}{2}(2(5) + (3-1)d) \right] \quad \frac{n}{2}(2u_1 + (n-1)d)$$

$$6(10 + 11d) = 10(15 + 3d)$$

$$60 + 66d = 150 + 30d$$

$$36d = 90$$

$$d = 90/36 = 2.5$$

Questions:

Notes:

EX | Find the number of terms in the series $8192 + 6144 + 4608 + \dots + 1458$

$$u_1 = 8192 \quad r = \frac{6144}{8192} = \frac{3}{4} \quad \downarrow n?$$

$$u_n = u_1 (r^{n-1})$$

give the term value for a particular n in a sequence.

$$\frac{1458}{8192} = \frac{8192}{8192} \left(\frac{3}{4}\right)^{n-1}$$

$$\frac{1458}{8192} = \frac{3^{n-1}}{4}$$

$$\ln\left(\frac{1458}{8192}\right) = (n-1)\ln\left(\frac{3}{4}\right)$$

$$\ln\left(\frac{1458}{8192}\right) = n \ln\left(\frac{3}{4}\right) - \ln\left(\frac{3}{4}\right)$$

$$\frac{\ln\left(\frac{1458}{8192}\right) + \ln\left(\frac{3}{4}\right)}{\ln\left(\frac{3}{4}\right)}$$

$$n = 7$$

| Questions: | Notes: |
|------------|--|
| | <p><u>Ex</u>) least value of n for which $S_n > 500$ in the series $3 + 3\sqrt{2} + 6 + 6\sqrt{2} + \dots$</p> <p>$u = 3$ $r = \sqrt{2}$</p> $S_n = \frac{3(\sqrt{2}^n - 1)}{\sqrt{2} - 1}$ <p>$n = 13$</p> |
| | <p>HW18 6I p176 1ad,2bd,3 6J p178 1ac,2,3,4</p> |