

I. Complete the chart below. Must show work for credit!

| Given Sequence | Determine If Geometric | Common Ratio r | Next Three Terms |
|---|--|---------------------------|--|
| 1.) 6, 12, 24, 72, ... | $\frac{12}{6} = 2$, $\frac{24}{12} = 2$, $\frac{72}{24} = 3 \rightarrow$ NO | $r = N/A$ | XXXX |
| 2.) 18, -54, 162, ... | $\frac{-54}{18} = -3$, $\frac{162}{-54} = -3 \rightarrow$ Yes | $r = -3$ | $a_4 = 162 \times -3 = -486$ $a_5 = -486 \times -3 = 1458$ $a_6 = 1458 \times -3 = -4374$ |
| 3.) 256, 128, 64, 32, ... | $\frac{128}{256} = .5$, $\frac{64}{128} = .5$, $\frac{32}{64} = .5 \rightarrow$ Yes | $r = \frac{1}{2}$ or $.5$ | $a_5 = 32 \div 2 = 16$ $a_6 = 16 \div 2 = 8$ $a_7 = 8 \div 2 = 4$ |
| 4.) $7, -\frac{14}{3}, \frac{28}{9}, -\frac{56}{27}, \dots$ | $\frac{-14/3}{7} = -\frac{2}{3}$, $\frac{28/9}{-14/3} = -\frac{2}{3}$, $\frac{-56/27}{28/9} = -\frac{2}{3} \rightarrow$ Yes | $r = -\frac{2}{3}$ | $a_5 = -\frac{56}{27} \times -\frac{2}{3} = \frac{112}{81}$ $a_6 = \frac{112}{81} \times -\frac{2}{3} = -\frac{224}{243}$ $a_7 = -\frac{224}{243} \times -\frac{2}{3} = \frac{448}{729}$ |

II. Find the indicated term of each geometric sequence. Must show work for credit!

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| 5.) $a_1 = 5$ and $r = 2$; find the 6 th term $a_6 = 5(2)^{6-1}$ $a_6 = 160$ | 6.) $a_1 = 53,248$ and $r = -\frac{1}{4}$; find the 10 th term $a_{10} = 53248(-\frac{1}{4})^{10-1}$ $a_{10} = -\frac{17}{64}$ | 7.) Find a_8 for sequence $-12, -6, -3, \dots$ $r = -\frac{1}{2}$ $a_8 = -12(\frac{1}{2})^{8-1}$ $a_8 = -\frac{3}{32}$ | 8.) Find a_7 for sequence $20, 180, 1620, \dots$ $r = \frac{180}{20} = 9$ $a_7 = 20(9)^{7-1}$ $a_7 = 10628520$ |
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III. Considering all given sequences are geometric – Find what is asked. SHOW WORK!!!

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| 9.) The 10 th term of the sequence is -50,388,480 and the common ratio is 6. What is the first term? $-50388480 = a_1(6)^{10-1}$ $\frac{-50388480}{6^9} = \frac{a_1}{6^9}$ $a_1 = -5$ | 10.) What is the common ratio for the sequence where the first term is 78 and the 7 th term is 1.21875? $1.21875 = 78(r)^{7-1}$ $\sqrt[6]{\frac{1.21875}{78}} = \sqrt[6]{r^6}$ $r = .5$ or $\frac{1}{2}$ | 11.) Which term of the sequence 2, 14, 98, ... is 4,802? $r = \frac{14}{2} = 7$ $4802 = 2(7)^{n-1}$ $\frac{4802}{2} = 7^{n-1}$ $2401 = 7^{n-1}$ $(\log 2401) = (n-1)(\log 7)$ $\frac{\log 2401}{\log 7} = \frac{(n-1)(\log 7)}{\log 7}$ $n = 5$ 5 th term |
| 12.) The fourth term is 16 and the eighth term is 1. What is value of r? $16 = a_1 r^3$ $1 = a_1 r^7$ $\frac{16}{1} = \frac{a_1 r^3}{a_1 r^7}$ $16 = r^{-4}$ $\sqrt[4]{16} = \sqrt[4]{r^{-4}}$ $r = \frac{1}{2}$ | 13.) The first term is 2 and the second term is 10. Is 781,250 a term of the given sequence? $781250 = 2(r)^{n-1}$ $390625 = (r)^{n-1}$ $\log 390625 = (n-1) \log r$ $\log 390625 = (n-1) \log 5$ $\frac{\log 390625}{\log 5} = \frac{(n-1) \log 5}{\log 5}$ $n = 9$ Yes - 9 th term | 14.) The fifth term is -98,304 and the third term is -1,536. What is the nth term? $-98304 = a_1 r^4$ $-1536 = a_1 r^2$ $\frac{-98304}{-1536} = \frac{a_1 r^4}{a_1 r^2}$ $64 = r^2$ $r = 8$ $a_1 = -24$ $a_n = -24(8)^{n-1}$ |
| 15.) The sixth term is 3 and the common ratio is 2. What is a_{12} ? $3 = a_1(2)^5$ $\frac{3}{2^5} = \frac{a_1}{2^5}$ $a_1 = \frac{3}{32}$ $a_{12} = \frac{3}{32}(2)^{12-1}$ $a_{12} = 192$ | 16.) What are the four geometric means between 1 and 7776? $1, \underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad}, 7776$ $7776 = 1(r)^5$ $\sqrt[5]{7776} = \sqrt[5]{r^5}$ $r = 6$ | 17.) The ninth term is 32,805 and the twelfth term is 885,735. What is the eighteenth term? $32805 = a_1 r^8$ $885735 = a_1 r^{12}$ $\frac{32805}{885735} = \frac{a_1 r^8}{a_1 r^{12}}$ $\frac{1}{27} = r^{-4}$ $27 = r^4$ $r = 3$ $a_1 = 5$ $a_{18} = 5(3)^{18-1}$ $a_{18} = 64570815$ |
| 18.) What are the three geometric means between 4 and 64? $4, \underline{\quad}, \underline{\quad}, \underline{\quad}, 64$ $64 = 4(r)^4$ $\frac{64}{4} = r^4$ $16 = r^4$ $r = 2$ | 19.) If $a_1 = -4$ and $r = 3.2$, then is -0.038147 a part of the sequence? $-0.038147 = -4(3.2)^{n-1}$ $.00953675 = (3.2)^{n-1}$ $\log .00953675 = (n-1) \log 3.2$ $\frac{\log .00953675}{\log 3.2} = \frac{(n-1) \log 3.2}{\log 3.2}$ $n = -2.955993364 \rightarrow$ NO | 20.) The eighth term is 49,152 and the first term is 3. What is the seventh term? $49152 = 3(r)^7$ $\frac{49152}{3} = r^7$ $16384 = r^7$ $\sqrt[7]{16384} = \sqrt[7]{r^7}$ $r = 4$ $a_7 = 3(4)^{7-1}$ $a_7 = 12288$ |