Precalc 12.2

Find the nth term and geometric means of a sequence $r =$

Find the sum of n terms of a geometric series

geometric sequence

common ratio (r)

a_1 ___ ___ ___ a_n

geometric means

geometric series S_{12}

Geometric Sequence	A geometric sequence is a sequence in which each term after the first, a_1, is the product of the preceding term and the common ratio, r. The terms of the sequence can be represented as follows, where a_1 is nonzero and r is not equal to 1 or 0. $a_1, a_1r, a_1r^2, \ldots$

10. Write a sequence that has two geometric means between 4 and 256.

4 $\underline{16}$ $\underline{64}$ 256

a_1

$a_4 = a_1 r^3$

$256 = 4r^3$

$64 = r^3$

$r = 4$

34

if $r = \frac{3}{4}$

$256 \quad \boxed{192 \quad 144 \quad 108} \quad 81$

if $r = -\frac{3}{4}$ $\boxed{-192 \quad 144 \quad -108}$ $a_5 = a_1 r^4$

$\frac{81}{256} = \frac{256 r^4}{256}$

$\pm 192, 144, \pm 108$

$\sqrt[4]{\frac{81}{256}} = \sqrt[4]{r^4}$

$\pm \frac{3}{4}$

11. What is the sum of the first six terms of the series $3 + 9 + 27 + \cdots$?

$$S_6 = \frac{a_1(1 - r^n)}{1 - r} = \frac{3(1 + {}^{-}3^6)}{-2}$$

$$= \frac{3(1 - 729)}{-2} = \frac{3(-728)}{-2}$$

$$= 1092$$

55%

$1-.45$

$n=6$

ACCOUNTING Bertha Blackwell is an accountant for a small company. On January 1, 1996, the company purchased $50,000 worth of office copiers. Since this equipment is a company asset, Ms. Blackwell needs to determine how much the copiers are presently worth. She estimates that copiers depreciate at a rate of 45% per year. What value should Ms. Blackwell assign the copiers on her 2001 year-end accounting report? *This problem will be solved in Example 3.*

1996 Jan 1 50,000

$50{,}000(0.55)^{n-1}$

~~2001~~
2002 Jan 1 ?

$50{,}000(.55)^5$

2516

3 ACCOUNTING Refer to the application at the beginning of the lesson. Compute the value of the copiers at the end of the year 2001.

$\left(\frac{0.02}{4}\right)^4$

Suppose at the beginning of each quarter you deposit \$25 in a savings account that pays an APR of 2% compounded quarterly. Most banks post the interest for each quarter on the last day of the quarter. The chart below lists the additions to the account balance as a result of each successive deposit through the rest of the year. Note that $1 + \frac{r}{n} = 1 + \frac{0.02}{4}$ or 1.005.

Date of Deposit	$A = P\left(1 + \frac{r}{n}\right)^{tn}$	1st Year Additions (to the nearest penny)
January 1	\$25 $(1.005)^4$ *	\$25.50
April 1	\$25 $(1.005)^3$	\$25.38
July 1	\$25 $(1.005)^2$	\$25.25
October 1	\$25 $(1.005)^1$	\$25.13
Account balance at the end of one year		\$101.26

$\boxed{a \cdot \left(1 + r\frac{n}{t}\right)^{nt}}$

=

* The number of quarters that the money is in the account earning interest.

6 **INVESTMENTS** Hiroshi wants to begin saving money for college. He decides to deposit $500 at the beginning of each quarter (January 1, April 1, July 1, and October 1) in a savings account that pays an APR of 6% compounded quarterly. The interest for each quarter is posted on the last day of the quarter. Determine Hiroshi's account balance at the end of one year.

$$500\left(1+\frac{.06}{4}\right)^{4 \cdot t}$$

WB 12.2