

## Finding and Using the Common Ratio in a Geometric Sequence

A geometric sequence is a sequence generated by multiplying the previous term by the same number.

The number that you multiply by is called the **common ratio**.

*Example 1.*      2, 6, 18, 54      common ratio = 3

$$\frac{6}{2} = 3 \quad \frac{18}{6} = 3$$

*Example 2.*      -12, 4,  $-\frac{4}{3}$       common ratio =  $-\frac{1}{3}$

$$\frac{4}{-12} = -\frac{1}{3}$$

To calculate the common ratio find  $\frac{u_2}{u_1}$  or  $\frac{u_3}{u_2}$

*Example 3.*      If 3, x, 9 are the first 3 terms of a geometric sequence, find the exact value of x

$$\frac{x}{3} = \frac{9}{x}$$

$$(\times 3) x = \frac{27}{x}$$

$$(\times x) x^2 = 27$$

$$x = \sqrt{27}$$

$$x = 3\sqrt{3}$$