

Mathematics 11U

7.6 – Geometric Series

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Again, two formulas:

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

$$S_n = \frac{\overset{t_1}{\cancel{ar^n}} - \cancel{a}}{r - 1}$$

$$t_n = ar^{n-1}$$

$$\boxed{t_{n+1} = ar^{n+1}}$$

$$S_n = \frac{t_{n+1} - t_1}{r - 1}$$

Example 1

Find S_{12} of the sequence 12, 24, 48,

$$r = \frac{24}{12} = 2$$

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

$$S_{12} = \frac{12(2^{12} - 1)}{2 - 1}$$

$$S_{12} = 49140$$

Example 2

Calculate the sum of the geometric series:

$$3 - 15 + 75 - \dots - 234375$$

t_1 t_n t_{n+1}

$\times -5$

1171875

$$S_n = \frac{t_{n+1} - t_1}{r - 1}$$

$$r = \frac{-15}{3} = -5$$

$$S_n = \frac{1171875 - 3}{-5 - 1}$$

$$S_n = -195312$$