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1 Evaluate the following: **(a)** $8 - 4 + 2 - \ldots$ **(b)** $4 + 3 + 2\frac{1}{4} + \ldots$

1 Evaluate the following: **(c)** $25 - 10 + 4 + \ldots$ **(d)** $\left(\sqrt{3}+1\right) + 1 + \frac{\left(\sqrt{3}-1\right)}{2} + \ldots$

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2 If $1 + 2x + 4x^2 + \ldots = \frac{3}{4}$, find the value of x.

3 Find the first three terms of a geometric series given that the sum of the first four terms is $21\frac{2}{3}$ and the sum to infinity is 27.

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5 The sum of the first four terms of a geometric series is 30 and the sum of the infinite series is 32. Find the first three terms.

7 Find the sum of the series $1+\frac{1}{a+1}+\frac{1}{(a+1)^2}+\ldots$ For what values of a does this infinite series have a sum?

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9 Find the fractional equivalent of: **(a)** $2.3\dot{8}$ **(b)** $4.\dot{6}\dot{2}$ **(c)** 0.417 17…

11 Show that 1.2888… is a rational number by expressing it in the form $\frac{m}{n}$, where m and n are integers with no common factor.

12 Evaluate $\dfrac{1+2+3+\ldots+10}{1+\frac{1}{2}+\frac{1}{4}+\ldots+\frac{1}{512}}$.

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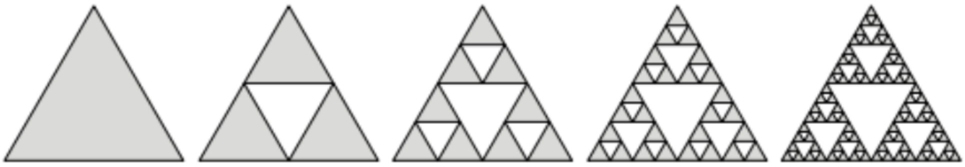
14 The Sierpinski triangle can be constructed by starting with an equilateral triangle, dividing it into four congruent equilateral triangles and then removing the central one. The process is then repeated in each of the remaining smaller triangles as shown in the diagram.



Let the initial triangle have an area of 1 square unit.

(a) How much of the original triangle remains shaded in the third diagram?
(b) How much of the original triangle remains shaded in the tenth diagram?
(c) Discuss what happens to the remaining area as the number of triangles increases.