

**Aim: Practice with Infinite Series****I. Do Now:**

1. Find the sum, if it exists, for the following series.

$$(a) \sum_{i=1}^{\infty} -7(0.23)^{i-1} \quad (b) \sum_{i=1}^{\infty} 8\left(\frac{5}{4}\right)^{i-1} \quad (c) \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{9} + \frac{1}{8} + \frac{1}{27} + \frac{1}{16} + \dots$$

**II. More Practice:**2. Find the sum of an infinite geometric series whose first term is 3 and whose common ratio is  $\frac{2}{5}$ .

3. State whether the infinite geometric series converges or diverges. If the series converges, find its sum.

$$(a) 24 + 20 + \frac{50}{3} + \frac{125}{9} + \dots \quad (b) \sum_{n=1}^{\infty} \left(-\frac{3}{2}\right)^{n-1}$$

$$(c) \sum_{n=0}^{\infty} -\frac{1}{8}\left(-\frac{1}{2}\right)^n \quad (d) 16 - 12 + 9 - 6.75 + \dots$$

$$(e) 2 - \frac{1}{3} + 1 - \frac{1}{9} + \frac{1}{2} - \frac{1}{27} + \frac{1}{4} - \frac{1}{81} \dots$$

4. Find the sum of the series  $\frac{\sqrt{2}}{5} + \frac{1}{5} + \frac{\sqrt{2}}{10} + \frac{1}{10} + \dots$ 5. A ball dropped 60 feet rebounds on each bounce to  $\frac{3}{4}$  of the distance from which it fell. How far will it travel before coming to rest?

6. Because of air resistance, the length of each swing of certain pendulum is 85% of the length of the previous swing. If the first swing has length 40 cm, find the total length the pendulum will swing before coming to rest.

7. Use an infinite geometric series to express each repeating decimal as a fraction:

$$(a) 0.88888\dots \quad (b) 0.14141414\dots \quad (c) 0.341414141\dots$$

$$(d) 0.300130013001\dots \quad (e) 0.014949494949\dots \quad (f) 4.23737373737\dots$$

8. The sum of an infinite geometric series is 125 and its 7<sup>th</sup> and 8<sup>th</sup> terms are  $\frac{192}{625}$  and  $\frac{384}{3125}$ , respectively. Find the first three terms of the series.9. The first term of an infinite geometric series is  $-8$ , and its sum is  $-\frac{64}{3}$ . Find the first four terms of the series.