Name	Date	Class

## **Practice B 12-5** Mathematical Induction and Infinite Geometric Series

Determine whether each geometric series converges or diverges.

**1.**  $\frac{81}{625} + \frac{27}{125} + \frac{9}{25} + \frac{3}{5} + 1 + \cdots$  **2.**  $1 - \frac{3}{5} + \frac{9}{25} - \frac{27}{125} + \frac{81}{625} - \cdots$ 

Find the sum of each infinite geometric series, if it exists.

**3.**  $7 + \frac{7}{4} + \frac{7}{16} + \frac{7}{64} + \cdots$  **4.** 500 - 300 + 180 - 108 + ...

**5.** 
$$\sum_{k=1}^{\infty} \frac{1}{4} \left(\frac{4}{3}\right)^k$$
 **6.**  $\sum_{k=1}^{\infty} 99 \left(-\frac{4}{9}\right)^k$ 

Write each repeating decin	nal as a fraction in simplest form.
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<b>7.</b> 0.16	<b>8.</b> 0.016	<b>9.</b> 0.016	
<b>10.</b> 0.045	<b>11.</b> 0.1	<b>12.</b> 0.123	

Identify a counterexample to disprove each statement.

**13.**  $2^{-n} < n^2$  **14.**  $n^3 \ge 3n$ 

## Solve.

- **15.** Ron won a prize that pays \$200,000 the first year and half of the previous year's amount each year for the rest of his life.
  - **a.** Write the first 4 terms of a series to represent the situation.

b.	Write a general rule for a geometric sequence that models his prize each year.	
c.	Estimate Ron's total prize in the first 10 years.	
d.	If Ron lives forever, what is the total of his winnings?	

	LESSON Practice B
<b>12-5</b> <i>Mathematical Induction and Infinite Geometric Series</i>	<b>12-51</b> Mathematical Induction and Infinite Geometric Series
1 $25 \pm 20 \pm 16 \pm 12.8 \pm 12.8$	Petermine whether each geometric series converges or diverges.
a. Find and simplify the common ratio.	<b>1.</b> $\frac{61}{625} + \frac{27}{125} + \frac{3}{25} + \frac{3}{5} + 1 + \cdots$ <b>2.</b> $1 - \frac{3}{5} + \frac{3}{25} - \frac{27}{125} + \frac{61}{625} - \cdots$
b. Use the ratio to determine whether the series	Diverges Converges
converges or diverges.	Find the sum of each infinite geometric series if it evicts
<b>2.</b> $\frac{1}{16} + \frac{1}{8} + \frac{1}{4} + \frac{1}{2} + \cdots$ <b>3.</b> $35.2 + 8.8 + 2.2 + 0.55 + \cdots$	<b>3</b> $7 + 7 + 7 + 7 + \cdots$ <b>4</b> 500 - 300 + 180 - 108 +
Diverges Converges	<b>3.</b> $7 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{16}$
Find the sum of each infinite geometric series if it exists	312.5
<b>4.</b> $864 + 576 + 384 + 256 + \cdots$	5. $\sum_{k=1}^{\infty} \frac{1}{2} \left(\frac{4}{2}\right)^{k}$ 6. $\sum_{k=1}^{\infty} 99 \left(-\frac{4}{2}\right)^{k}$
a. Test the series for convergence. Converges	$\sum_{k=1}^{n-1} \left( \begin{array}{c} \mathbf{y} \right)$
<b>b.</b> Use the formula $S = \frac{a_1}{1-r}$ to find the sum.	
<b>5.</b> $200 + 150 + 112.5 + 84.375 + \cdots$ <b>6.</b> $\frac{2}{5} - \frac{4}{25} + \frac{8}{125} - \frac{16}{625} + \cdots$	Write each repeating decimal as a fraction in simplest form.
800 27	<b>7.</b> 0.16 <b>8.</b> 0.016 <b>9.</b> 0.016
<b>7 2 4 4 8 16 16 8 4 2 10</b>	$\frac{16}{99}$ $\frac{16}{999}$ $\frac{16}{999}$
	<b>10.</b> 0.045 <b>11.</b> 0.1 <b>12.</b> 0.123
Does not exist	1 1 41
Write each repeating decimal as a fraction in simplest form	9 333
9. 0.57	Identify a counterexample to disprove each statement.
a. Write the decimal as an infinite series.	<b>13.</b> $2^{-n} < n^2$ <b>14.</b> $n^3 \ge 3n$
0.57 + 0.0057 + 0.000057 +	Possible answer: $n = -5$ Possible answer: $n = -2$
<b>b.</b> Find the common ratio. <b>c.</b> Use $S = \frac{a_1}{1 - r}$ to write the fraction.	Salua
0.01 <u>19</u>	15. Bon won a prize that have \$200,000 the first year and half of the
	previous year's amount each year for the rest of his life.
<b>10.</b> 0.7 <b>11.</b> 0.83 <b>12.</b> 0.23	a. Write the first 4 terms of a series to represent the situation.
$\frac{7}{0}$ $\frac{5}{6}$ $\frac{23}{00}$	$\frac{200,000 + 100,000 + 30,000 + 23,000 +}{100,000 + 100,0000 + 100,000,$
	b. Write a general rule for a geometric sequence that models his prize each year. $\underline{a_n = 200,000 (0.5)^{n-1}}$
	c. Estimate Ron's total prize in the first 10 years.
	d. If Ron lives forever, what is the total of his winnings? \$400,000
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Practice C           12-5         Mathematical Induction and Infinite Geometric Series	Reteach
LESSON         Practice C           1223         Mathematical Induction and Infinite Geometric Series           Find the sum of each infinite geometric series, if it exists.	Reteach           12-5         Mathematical Induction and Infinite Geometric Series           An infinite geometric series has infinitely many terms.
Image: Practice C           Image: Practing C           Image: Practing C	Reteach           Mathematical Induction and Infinite Geometric Series           An infinite geometric series has infinitely many terms.           You add some of the terms of an infinite geometric series to find a partial sum of the series.
Itesson         Practice C           Itesson         Mathematical Induction and Infinite Geometric Series           Find the sum of each infinite geometric series, if it exists.         2.54 + 18 + 6 + 2 +           1. $-10 + 0.4 - 0.016 + 0.00064$ 2.54 + 18 + 6 + 2 + $\frac{250}{26}$ 81	Reteach           Mathematical Induction and Infinite Geometric Series           An infinite geometric series has infinitely many terms.           You add some of the terms of an infinite geometric series to find a partial sum of the series.           When the partial sum approaches a fixed number, the partial sum approaches a fixed number, the geometric series is and the series.
LESSON       Practice C         12:53       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.         1. $-10 + 0.4 - 0.016 + 0.00064$ 2. $54 + 18 + 6 + 2 +$ $\frac{250}{26}$ 81         a $\frac{5}{2}(3)^k$	Reteach         Mathematical Induction and Infinite Geometric Series         An infinite geometric series has infinitely many terms.         You add some of the terms of an infinite geometric series to find a partial sum of the series.         When the partial sum approaches a fixed number, the series is said to converge.         A geometric series converges when $ r  < 1$ .
Existing         Practice C           12:550         Mathematical Induction and Infinite Geometric Series           Find the sum of each infinite geometric series, if it exists.           110 + 0.4 - 0.016 + 0.00064         2. 54 + 18 + 6 + 2 + $\frac{250}{26}$ 81           3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$	<b>Reteach</b> <b>Mathematical Induction and Infinite Geometric Series</b> An <b>infinite geometric series</b> has infinitely many terms. You add some of the terms of an infinite geometric series to find a partial sum of the series. When the partial sum approaches a fixed number, the series is said to <b>converge</b> . When the partial sum does not approach a fixed number, the series is said to <b>lowerge</b> .
LESSONPractice C12:55Mathematical Induction and Infinite Geometric SeriesFind the sum of each infinite geometric series, if it exists.1. $-10 + 0.4 - 0.016 + 0.000642. 54 + 18 + 6 + 2 +2. \frac{250}{26}813. \sum_{k=1}^{\infty} \frac{2(3)^k}{3})^k4. \sum_{k=1}^{\infty} 100 \left(-\frac{3}{4}\right)^kDoes not exist$	Reteach         Mathematical Induction and Infinite Geometric Series         An infinite geometric series has infinitely many terms.         You add some of the terms of an infinite geometric series to find a partial sum of the series.         When the partial sum approaches a fixed number, the series is said to converge.         When the partial sum does not approach a fixed number, the series is said to diverge.         A geometric series diverges when $ r  < 1$ .
LESSONPractice C1255Mathematical Induction and Infinite Geometric SeriesFind the sum of each infinite geometric series, if it exists.1. $-10 + 0.4 - 0.016 + 0.000642. 54 + 18 + 6 + 2 +\frac{250}{26}813. \sum_{k=1}^{\infty} \frac{2(3)^k}{3})^k4. \sum_{k=1}^{\infty} 100(-\frac{3}{4})^kWrite each repeating decimal as a fraction in simplest form.$	Reteach         Mathematical Induction and Infinite Geometric Series         An infinite geometric series has infinitely many terms.         You add some of the terms of an infinite geometric series to find a partial sum of the series.         When the partial sum approaches a fixed number, the series is said to converge.       A geometric series converges when $ r  < 1$ .         When the partial sum does not approach a fixed number, the series is said to diverge.       A geometric series diverges when $ r  < 1$ .         To determine whether a geometric series converges or diverges, compare the absolute value
Practice C           1255 Mathematical Induction and Infinite Geometric Series           Find the sum of each infinite geometric series, if it exists.           110 + 0.4 - 0.016 + 0.00064         2. 54 + 18 + 6 + 2 + $\frac{250}{26}$ 81           3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ Does not exist $-\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.\overline{72}$ 8	Reteach         Mathematical Induction and Infinite Geometric Series         An infinite geometric series has infinitely many terms.         You add some of the terms of an infinite geometric series to find a partial sum of the series.         When the partial sum approaches a fixed number, the series is said to converge.       A geometric series converges when $ r  < 1$ .         When the partial sum does not approach a fixed number, the series is said to diverge.       A geometric series diverges when $ r  \ge 1$ .         To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.
Itesser         Practice C           Itesser         Mathematical Induction and Infinite Geometric Series           Find the sum of each infinite geometric series, if it exists.           110 + 0.4 - 0.016 + 0.00064         2. 54 + 18 + 6 + 2 + $\frac{250}{26}$ 81           3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ Does not exist $-\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ $\frac{8}{11}$ $\frac{4}{55}$ $\frac{8}{111}$ $\frac{8}{111}$	Reteach         Mathematical Induction and Infinite Geometric Series         An infinite geometric series has infinitely many terms.         You add some of the terms of an infinite geometric series to find a partial sum of the series.         When the partial sum approaches a fixed number, the series is said to converge.       A geometric series converges when $ r  < 1$ .         When the partial sum does not approach a fixed number, the series is said to diverge.       A geometric series diverges when $ r  = 1$ .         To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $2 - 4 + 8 - 16 + 32 + \cdots$
Practice C           Itessee           Find the sum of each infinite geometric series, if it exists.           1. $-10 + 0.4 - 0.016 + 0.00064         2. 54 + 18 + 6 + 2 +           250           26         81           3. \sum_{k=1}^{\infty} 3(\frac{3}{2})^k         4. \sum_{k=1}^{\infty} 100(-\frac{3}{4})^k           Does not exist           To 0.072           Nrite each repeating decimal as a fraction in simplest form.           5. 0.72         6. 0.072         7. 0.072 \frac{8}{11} \frac{4}{55}           8. 3.6552         9. \frac{4}{1.409}         10. 0.7714285 $	ReteachReteachMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ Step 1 Find the common ratio. $2 - 4 + 8 - 16 + 32 + \cdots$ Step 1 Find the common ratio.
Description $\frac{250}{26}$ $\frac{250}{26}$ $\frac{250}{26}$ $\frac{81}{2}$ 3. $\sum_{k=1}^{\infty} \frac{2(3)}{3}^k$ 4. $\sum_{k=1}^{\infty} 100 \left(-\frac{3}{4}\right)^k$ $\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ 8. $3.6552$ 9. $1.409$ 10. $0.7714285$ $\frac{6086}{1665}$ $\frac{31}{22}$	ReteachMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges 
Description $\frac{250}{26}$ $\frac{250}{26}$ $81$ 3. $\sum_{k=1}^{\infty} \frac{2(3)}{3(2)}^k$ 4. $\sum_{k=1}^{\infty} 100 \left(-\frac{3}{4}\right)^k$ $\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ 8. $3.6552$ 9. $1.409$ 10. $0.7714285$ $\frac{8}{7}$ Use mathematical induction to prove.	ReteachMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{2}{1} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1.
Itessed Practice C         Itessed Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 + $\frac{250}{26}$ 81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$ Does not exist         - $\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ Motion formation in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ Mathematical induction to prove.         11. $\sum_{n=1}^{n} \frac{20}{1405}$ 10. $0.714285$ Gome attematical induction to prove.         11. $\sum_{n=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ The sect of the sect of the sect of the sector is a sector of the sector o	ReteachMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \geq 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ Step 1 Find the common ratio. $2 - 4 + 8 - 16 + 32 + \cdots$ Step 1 Find the common ratio. $r = \frac{-1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$
Itessed       Practice C         Itessed       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         2. 54 + 18 + 6 + 2 +         2. $\frac{250}{26}$ 81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$ Does not exist         - $\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.\overline{72}$ 6. $0.0\overline{72}$ 7. $0.0\overline{72}$ Not exist $\frac{8}{11}$ 9. $\frac{4}{1.409}$ 10. $0.\overline{714285}$ $\frac{6086}{1665}$ $31$ $5$ $\frac{6086}{1665}$ $31$ $5$ $\frac{7}{r}$ Use mathematical induction to prove. $11.$ $11.$ $\sum_{k=1}^{n} \frac{2}{r(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ $\frac{2}{r}$ For $n = 1: \frac{2(1)}{r} = 1$ 11 the statement is true for $n = a$ , then $\sum \frac{2}{r} = \frac{2a}{r}$	ReteachTesseeMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{2}{1} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ ,Since $\frac{1}{2} < 1$ ,
Itessed       Practice C         Itessed       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$ More not exist	ReteachTesseeMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  = 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{2}{1} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Since $\frac{1}{2} < 1$ , the series converges.
Practice C         Itessen       Practice C         Itessen       Ind the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +       81         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} \frac{100(-\frac{3}{4})^k}{100(-\frac{3}{4})^k}$ Observe the each repeating decimal as a fraction in simplest form.         5. $0.\overline{72}$ 6. $0.0\overline{72}$ 7. $0.\overline{072}$ $\frac{8}{11}$ $\frac{4}{55}$ $10.$ $0.\overline{77}$ Write each repeating decimal as a fraction in simplest form.       5. $0.\overline{72}$ $6.$ $0.0\overline{72}$ $7.$ $0.\overline{0.72}$ $\frac{8}{11}$ $\frac{4}{55}$ $10.$ $0.\overline{77}$ Use mathematical induction to prove. $11.$ $\frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ Let $n = a + 1.$ $\frac{21}{k(k+1)} = \frac{2n}{a+1}$ $\frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ Let $n = a + 1.$ $\frac{2}{k(k+1)} = \frac{2n}{a+1} + \frac{2}{(a+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+2)} $	ReteachTesseeMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{1}{2} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.
Sign Practice C         Itesser       Practice C         Itesser       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         Image: Series       81       81       81         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ 81         Series       81       81         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ 81         Write each repeating decimal as a fraction in simplest form.       5. $0.72$ 6. $0.072$ 7. $0.072$ 8. $3.6552$ 9. $1.409$ 10. $0.714285$ 8       111         8. $3.6552$ 9. $1.409$ 10. $0.714285$ 5         9. $1.409$ 10. $0.714285$ 5       7         Use mathematical induction to prove.       11. $\sum_{k=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ Use mathematical induction to prove.         It is the statement is true for $n = a$ , then $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ .         Let $n = a + 1$ . $\sum_{k=1}^{n+1} \frac{2}{k(k+1)} = \frac{2a}{a+1} + \frac{2}{(a+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+$	ReteachIterstopMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series converges or diverges, when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.Determine whether each geometric series converges or diverges.1 (r) $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series diverges.Determine whether each geometric series converges or diverges.Determine whether each geometric series converges or diverges.1 (r) $ -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series diverges.Determine whether each geometric series converges or diverges.Determine whether each geometric series converge
Biggstress       Practice C         Itessen       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         Image: Series       81       81         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ Does not exist $-\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.       5. $0.72$ 6. $0.072$ 7. $0.072$ 8. $\frac{811}{3.6552}$ 9. $\frac{4}{1.409}$ 10. $0.714285$ $\frac{8}{111}$ 8. $3.6552$ 9. $1.409$ 10. $0.714285$ $\frac{5}{7}$ Use mathematical induction to prove.       11. $\sum_{k=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ $\frac{2}{k=1} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ Let $n = a + 1$ . $\sum_{k=1}^{a+1} \frac{2}{k(k+1)} = \frac{2a}{a+1} + \frac{2}{(a+1)(a+2)} = \frac{2a(a+2)+2}{(a+1)(a+2)} = \frac{2a(a+2)+2}{(a+1)(a+2)} = \frac{2(a+1)}{(a+1)(a+2)} = 2(a+1$	ReteachIterstopMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series to find a partial sum of the series.When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.Image: Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.Determine whether each geometric series converges or diverges.Let $1 = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$ Since $2 = 1$ , the series diverges.Determine whether each geometric series converges or diverges.Let $1 = \frac{3}{2}$ Since $\frac{1}{2} < 1$ $\frac{1}{16} + \frac{1}{16} + \cdots$ 2. 256 + 64 + 16 + 4 + 1 + \cdots $r = \frac{1}{4}$
Itesset       Practice C         Itesset       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ 81         3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} \frac{100}{(-\frac{3}{4})^k}$ 81         Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ $\frac{8}{11}$ 9. $\frac{4}{1.409}$ 10. $0.714285$ Image: Second secon	ReteachItersonMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.Integrating the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$ Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$ Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$ Step 2 A term sector converges.Determine whether each geometric series converges or diverges.1. $1 + \frac{3}{2} + \frac{9}{4} + \frac{2}{8} + \frac{81}{16} + \cdots$ 2. $256 + 64 + 16 + 4 + 1 + \cdots$ $r = \frac{3}{2}$ Integrating the series converges or diverges.
Itesset       Practice C         Itesset       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 + $             \frac{250}{26}         $ 81                 3. $\sum_{k=1}^{\infty} \frac{2}{3} \binom{2}{2}^k$ 4. $\sum_{k=1}^{\infty} 100 \left(-\frac{3}{4}\right)^k$ Does not exist               -300                 Write each repeating decimal as a fraction in simplest form.               7. 0.072 <u>             8.11             3.6552             9. 1.409             1.0.0714285             <u>             8.111             10.0714285             <u>             8.111             10.0714285             <u>             5.077             5.072             5.072             5.01             <u>             6086             31             10.0714285             <u>             10.0714285             5.0714285             <u>             10.0714285             10.0714285             10.01             10.0714285             10.01             10.01           </u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>	ReteachIterstorMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to converge.A geometric series diverges when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.I $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{1}{2} = -\frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{1}{2} = 1$ Step 2 Compare $ r $ to 1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.1. $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Sitep 2 Compare $ r $ to 1. $ r  = \frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{16} + \cdots$ Sitep 2 Compare $ r $ to 1. $ r  = \frac{1}{2} + \frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{16} + \cdots$ $r = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{16} + \frac{1}{16} + \frac{1}{16} + \cdots$ $r = \frac{1}{2} + \frac{1}{2} + \frac{1}{16} +$
Itesset       Practice C         Itesset       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 + $             \frac{250}{26}         $ 81                 3. $\sum_{k=1}^{\infty} \frac{2}{3} \binom{2}{2}^k         $ 81                 3. $\sum_{k=1}^{\infty} \frac{2}{3} \binom{2}{2}^k         $ 9. $\frac{1}{26}         $ 81                 3. $\sum_{k=1}^{\infty} \frac{2}{3} \binom{2}{2}^k         $ 4. $\sum_{k=1}^{\infty} 100 \left(-\frac{3}{4}\right)^k         $ Write each repeating decimal as a fraction in simplest form.               5. 0.72               6. 0.072                 5. 0.72               6. 0.072               7. 0.072 <u>             60865             <u>312             7             7           </u></u>	ReteachImathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series diverges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges, when $ r  \geq 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.Image: Step 1 Find the common ratio. $r = \frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2}$ Step 2 Compare $ r $ to 1.Step 2 Compare $ r $ to 1.Image: Science $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.1. $1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ $2 = 2$ Since $2 = 1$ , the series converges.Determine whether each geometric series converges or diverges. $1 = -\frac{3}{2}$ $r = -\frac{1}{4}$ Compare $ r $ to 1. $ r  to 1$ . </th
Itesset       Practice C         Itesset       Mathematical Induction and Infinite Geometric Series         Find the sum of each infinite geometric series, if it exists.       110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 + $             \frac{250}{26}         $ 81                 3. $\sum_{k=1}^{\infty} 2(3)^k$ 4. $\sum_{k=1}^{\infty} 100(-3)^k$ Does not exist               -300             7                 Write each repeating decimal as a fraction in simplest form.               5. 0.772                 5. 0.72             6. 0.072             7. 0.072               8. $\frac{111}{100}         $ 8. $3.6552$ 9. $1.409$ 10. $0.7714285$ <u>60866</u> 22             7               7                 Use mathematical induction to prove.               11. $\sum_{k=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ $\frac{2}{n+1} + \frac{2}{(k+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+2)} = \frac{2(a+1)}{(a+1) + 1};$ So $\sum_{k=1}^{n} \frac{2(n+1)}{k(k+1)} = \frac{2n}{n+1}.$ Identify a counterexample to disprove each statement.               12. $(2n+1)^3 > n^2$ 13. $4n^2 \le 2n^4$ Possible answer: $n = -1$ Possible answer: $n = 1$	ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesAn infinite geometric series of an infinite geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesAn infinite geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesOnverges when $ r  < 1$ .A geometric series converges when $ r  < 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio. $r = \frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -1  = 1/2$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.1. $1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ 2. $256 + 64 + 16 + 4 + 1 + \cdots$ $r = \frac{1}{2}$ Compare $ r $ to 1. $1 + \frac{3}{2} + 9$
Practice C         Itessen       Practice C         Itessen       Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +       81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$ 81         Sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         Sum of each infinite geometric series, if it exists.         3. $\sum_{k=1}^{\infty} \frac{250}{26}$ 81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{n(0)}$ Does not exist         - $\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ Meride each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ Use mathematical induction to prove.         11. $\sum_{k=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ Let $n = a + 1$ . $\sum_{k=1}^{a+1} \frac{2}{k(k+1)} = \frac{2a}{a+1} + \frac{2}{(a+1)(a+2)} = \frac{2a(a+2) + 2}{(a+1)(a+2)} = \frac{2(a+1)^2}{(a+1)(a+2)} = \frac{2(a+1)}{(a$	ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series diverges, when $ r  \ge 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{-1}{2}$ $2 - 4 + 8 - 16 + 32 + \cdots$ Step 1 Find the common ratio. $r = \frac{-4}{2} = -2$ Step 1 Find the common ratio. $r = \frac{-4}{2} = -2$ Step 2 Compare $ r $ to 1. $ r  =  -12  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Step 2 Compare $ r $ to 1.I $ r  =  -12  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.1. $1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ $r = \frac{3}{2}$ 2. $256 + 64 + 16 + 4 + 1 + \cdots$ Compare $ r $ to 1. $ \frac{1}{4}  < 1$ Compare $ r $ to 1. $ \frac{1}{4}  < 1$ Compare $ r $ to 1. $ \frac{1}{4}  < 1$ <
Practice C         Itessen       Practice C         Itessen       Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +       81         3. $\sum_{k=1}^{\infty} \frac{2(3)^k}{3(2)^k}$ 4. $\sum_{k=1}^{\infty} 100(-\frac{3}{4})^k$ 81         Obes not exist       -300         Write each repeating decimal as a fraction in simplest form.         5. $0.72$ 6. $0.072$ 7. $0.072$ 8         11. $\frac{8}{11}$ $\frac{4}{55}$ 10. $\frac{8111}{11}$ 8         Solve         11. $\sum_{k=1}^{n} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ For $n = 1$ : $\frac{2(1)}{(1) + 1} = 1$ If the statement is true for $n = a$ , then $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ .         Let $n = a + 1$ . $\sum_{k=1}^{2n} \frac{2(a+1)}{(a+1)+1} = \frac{2a}{a+1} + \frac{2}{(a+1)(a+2)} = \frac{2a(a+2)+2}{(a+1)(a+2)} = \frac{2(a+1)^2}{(a+1)(a+2)} = \frac{2(a+1)}{(a+1)+1}$ ; So $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2n}{n+1}$ .         Identify a counterexample to disprove each statement.         12. $(2n+1)^3 > n^2$ 13. $4n^2 \le 2n^4$ Possible answer: $n = 1$ Solive. <th>ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to onverge.A geometric series converges when <math> r  &lt; 1</math>.When the partial sum does not approach a fixed number, the series is said to onverge.A geometric series converges when <math> r  &lt; 1</math>.To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted <math> r </math>, to 1.<math>1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots</math> <math>r = \frac{1}{2}</math><math>2 - 4 + 8 - 16 + 32 + \cdots</math> Step 1 Find the common ratio. <math>r = \frac{4}{2} = -2</math>Step 1 Find the common ratio. <math>r = \frac{1}{2} = -\frac{1}{2}</math>Step 2 Compare <math> r </math> to 1. <math> r  =  -2  = 2</math> Since <math>\frac{1}{2} &lt; 1</math>, the series converges.Determine whether each geometric series converges or diverges.<math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{32}</math>Determine whether each geometric series converges or diverges.<math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{32}</math><math>1 \cdot 1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots</math> <math>r = \underline{32}</math><math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{32}</math><math>1 \cdot 1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots</math> <math>r = \underline{14}</math><math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{14}</math><math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{14}</math><math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{14}</math><math>2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots</math> <math>r = \underline{15}</math><math>1 - \frac{1}{5} + \frac{1}{25} - \frac{1}{125} + \frac{1}{625} + \cdots</math><math>1 - \frac{1}{5} + \frac{1}</math></th>	ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.When the partial sum approaches a fixed number, the series is said to onverge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to onverge.A geometric series converges when $ r  < 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \cdots$ $r = \frac{1}{2}$ $2 - 4 + 8 - 16 + 32 + \cdots$ Step 1 Find the common ratio. $r = \frac{4}{2} = -2$ Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -2  = 2$ Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges. $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{32}$ Determine whether each geometric series converges or diverges. $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{32}$ $1 \cdot 1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ $r = \underline{32}$ $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{32}$ $1 \cdot 1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ $r = \underline{14}$ $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{14}$ $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{14}$ $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{14}$ $2 \cdot 256 + 64 + 16 + 4 + 1 + \cdots$ $r = \underline{15}$ $1 - \frac{1}{5} + \frac{1}{25} - \frac{1}{125} + \frac{1}{625} + \cdots$ $1 - \frac{1}{5} + \frac{1}$
Practice C         Itessen         Practice C         Itessen         Find the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         State in the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         State in the sum of each infinite geometric series, if it exists.         110 + 0.4 - 0.016 + 0.00064       2. 54 + 18 + 6 + 2 +         Does not exist	ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesAn infinite geometric series of an infinite geometric series to find a partial sum of the series.A geometric series to find a partial sum of the series.Methematical Induction and Infinite Geometric SeriesAn infinite geometric series of an infinite geometric series converges to file series is said to onverge.A geometric series converges when $ r  < 1$ .To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio. $r = \frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{1}{2}$ Step 1 Find the common ratio. $r = \frac{-1}{2}$ Step 2 Compare $ r $ to 1. $ r  =  -1  = 12$ Since $\frac{1}{2} < 1$ ,the series converges.Determine whether each geometric series converges or diverges. $1.1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ $r = \frac{3}{2}$ Compare $ r $ to 1. $ r  = \frac{1}{2}$ Since $2 < 1$ ,the series convergesCompare $ r $ to 1. $ r  = \frac{1}{2}$ </th
<b>Practice C</b> <b>1250</b> <i>Mathematical Induction and Infinite Geometric Series</i> Find the sum of each infinite geometric series, if it exists. 1. $-10 + 0.4 - 0.016 + 0.00064$ 2. $54 + 18 + 6 + 2 +$ $\frac{250}{26}$ 81 3. $\sum_{k=1}^{\infty} \frac{2}{3} (\frac{3}{2})^k$ 4. $\sum_{k=1}^{\infty} 100 (-\frac{3}{4})^k$ $\boxed{Does not exist}$ $-\frac{300}{7}$ Write each repeating decimal as a fraction in simplest form. 5. $0.\overline{72}$ 6. $0.0\overline{72}$ 7. $0.\overline{072}$ $\frac{8}{11}$ 9. $\frac{4}{55}$ 10. $\frac{8}{111}$ 10. $0.\overline{714285}$ $\frac{6086}{1665}$ $\frac{31}{22}$ $\frac{5}{7}$ Use mathematical induction to prove. 11. $\sum_{k=1}^{\infty} \frac{2}{k(k+1)} = 1 + \frac{1}{3} + + \frac{2}{n(n+1)} = \frac{2n}{n+1}$ For $n = 1$ : $\frac{2(1)}{(1) + 1} = 1$ If the statement is true for $n = a$ , then $\sum_{k=1}^{a} \frac{2}{k(k+1)} = \frac{2a}{a+1}$ . $\frac{2(a+1)^2}{(a+1)(a+2)} = \frac{2(a+1)}{(a+1)+1}$ ; So $\sum_{k=1}^{n} \frac{2}{k(k+1)} = \frac{2n}{n+1}$ . Identify a counterexample to disprove each statement. 12. $(2n+1)^3 > n^2$ 13. $4n^2 \le 2n^4$ Possible answer: $n = -1$ Possible answer: $n = 1$ Solve. 14. A movie earned \$60 million in the first week that it was released. In each successive week, sales each week. b. Estimate the movie's stales ach week. b. Estimate the movie's total sales in the first 8 weeks. c. If this pattern continued indefinitiely, what would be	ReteachINSERTMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.My the the partial sum approaches a fixed number, the series is said to converge.A geometric series converges when $ r  < 1$ .When the partial sum does not approach a fixed number, the series is said to diverge.A geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.To determine whether a geometric series converges or diverges, compare the absolute value of the common ratio of the terms of the series, denoted $ r $ , to 1.Image: The series converges or diverges, compare the absolute value of the common ratio.The diverges Since $\frac{1}{2} < 1$ , the series converges.Determine whether each geometric series converges or diverges.Image: Since $\frac{1}{2} < 1$ , the series converges.Let compare $ r $ to 1.Image: Since $\frac{1}{2} < 1$ , the series converges.Image: Since $\frac{1}{2} < 1$ , the series converges.Image: Since $\frac{1}{2} < 1$ , the series converges.Image: Since $\frac{1}{2} < 1$ , the series diverges.Image: Since $\frac{1}{2} < 1$ , the series diverges.Image: Since $\frac{1}{2} < 1$ , the series converges.Image: Since $\frac{1}{2} < 1$ , the series
<b>Practice CItessonPractice CItessonPractice C</b> Find the sum of each infinite geometric series, if it exists.1. $-10 + 0.4 - 0.016 + 0.000642. 54 + 18 + 6 + 2 +250813. \sum_{k=1}^{\infty} 2(3)^k4. \sum_{k=1}^{\infty} 100(-3)^kDoes not exist-300OutputWrite each repeating decimal as a fraction in simplest form.5. 0.726. 0.0727. 0.0728. \frac{1}{11}6. 0.0727. 0.0728. \frac{1}{11}8. \frac{1}{11}1. \frac{2}{1100}1. \frac{2}{1100}1. \frac{2}{1100}1. \frac{2}{1100}1. \frac{2}{n(k+1)} = \frac{2}{n(k+1)} = \frac{2}{n+1}.1. \frac{2}{(k+1)^2} = \frac{2(a+1)}{(a+1)(a+2)} = \frac{2}{k(k+1)} = \frac{2}{n+1}.1. \frac{2}{(a+1)^2} = \frac{2(a+1)}{(a+1)+$	ReteachTesserReteachMathematical Induction and Infinite Geometric SeriesAn infinite geometric series has infinitely many terms.You add some of the terms of an infinite geometric series to find a partial sum of the series.MeteachYou add some of the terms of an infinite geometric series to find a partial sum of the series.MeteachYou add some of the terms of a partial sum approaches a fixed number. It eseries is said to converge.A geometric series diverges when $ r  < 1$ .When the partial sum does not approach a fixed number. It eseries is said to diverge.A geometric series diverges or diverges. A geometric series diverges or diverges. Step 1 Find the common ratio. $r = \frac{1}{2} = -\frac{1}{2}$ Step 2 Compare $ r $ to 1.If $ r  =  -\frac{1}{2}  = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges or diverges.Determine whether each geometric series converges or diverges.1It is a fight from $\frac{1}{2} = \frac{1}{2}$ Since $\frac{1}{2} < 1$ , the series converges or diverges.1. $1 + \frac{3}{2} + \frac{9}{4} + \frac{27}{8} + \frac{81}{16} + \cdots$ Compare $ r $ to 1.If $\frac{1}{2} = \frac{1}{2}$ Compare $ r $ to 1.If $\frac{1}{2} = \frac{1}{2}$ Compare $ r $ to 1.If $\frac{1}{2} = \frac{1}{2}$ Compare $ r $ to 1. <t< th=""></t<>