

Calculus 112 Practice Problems

Section 9.2 Problems #1-10, #20, #22

1. Yes, $a = 5$, ratio = -2 .
2. No. Ratio between successive terms is not constant: $\frac{1/3}{1/2} = 0.66\dots$, while $\frac{1/4}{1/3} = 0.75$.
3. Yes, $a = 2$, ratio = $1/2$.
4. Yes, $a = 1$, ratio = $-1/2$.
5. No. Ratio between successive terms is not constant: $\frac{2x^2}{x} = 2x$, while $\frac{3x^3}{2x^2} = \frac{3}{2}x$.
6. Yes, $a = 1$, ratio = $2z$.
7. No. Ratio between successive terms is not constant: $\frac{6z^2}{3z} = 2z$, while $\frac{9z^3}{6z^2} = \frac{3}{2}z$.
8. Yes, $a = 1$, ratio = $-x$.
9. Yes, $a = 1$, ratio = $-y^2$.
10. Yes, $a = y^2$, ratio = y .

20. This is a geometric series with first term y and ratio $-y$:

$$y - y^2 + y^3 - y^4 + \dots = \frac{y}{1 - (-y)} = \frac{y}{1 + y}.$$

This series converges for $|-y| < 1$, that is for $-1 < y < 1$.

22. We can rewrite the series as $3 + (x + x^2 + x^3 + \dots)$. The terms after the first term define a geometric series with first term x and ratio x . Therefore, we have

$$3 + x + x^2 + x^3 + \dots = 3 + (x + x^2 + x^3 + \dots) = 3 + \frac{x}{1 - x}.$$

This series converges for $|x| < 1$, that is for $-1 < x < 1$.