

1. Let $P(x)$ be the power series

$$1 + 2x + 3x^2 + 4x^3 + \cdots = \sum_{k=0}^{\infty} (k+1)x^k$$

- (a) Does the series converge when $x = 1$?
Hint: Check by plugging 1 in for x in the series.
- (b) Does the series converge when $x = -1$?
- (c) Does the series converge when $x = \frac{1}{2}$?
- (d) For what values of x does $P(x)$ converge absolutely?
Hint: Try the ratio test. Remember it only applies to positive terms, so take the absolute value!

2. Find the interval of convergence for the series $\sum_{k=1}^{\infty} \frac{x^k}{k2^k}$.