Recall: A **power series** is a series of the form

$$\sum_{k=0}^{\infty} a_k x^k \text{ or } \sum_{k=0}^{\infty} a_k (x - x_0)^k.$$

1. These series are fundamentally different from all the series we've seen before, in that they are actually functions – they contain a variable, x. (The k is not a variable, it's an index. If you write the sum out, it disappears. Nor is the x_0 usually a variable in the usual sense of the word – you choose the value of your basepoint when you get started.)

2. For each value of x, we have a different series.

3. For some values of x, the resulting series will converge absolutely, for others it will converge conditionally, and for still others, it will diverge.

Example from Monday:

$$\sum_{k=0}^{\infty}(-1)^k\frac{x^k}{k+1}.$$

You found this series

1. converges absolutely for all x in $-1 < x < 1$.

2. converges conditionally for $x = 1$.

3. diverges everywhere else.

Thus the **interval of convergence** is $-1 < x \leq 1$, and the **radius of convergence** is $r = 1$.

Find the interval of convergence for $\sum_{k=1}^{\infty} \frac{(x-1)^k}{k2^k}$