11.6: 16.

$$\sum_{n=1}^{\infty} \frac{n^{10}}{(-10)^{n+1}} \quad \lim_{n\to\infty} \left| \frac{(n+1)^{10}}{(-10)^{n+2}} \cdot \frac{(-10)^{n+1}}{n^{10}} \right| =$$

$$\lim_{n\to\infty} \left| \left(\frac{n+1}{n}\right)^{10} \cdot \frac{1}{(-10)} \right| = \frac{1}{10} < 1$$

It is convergent.

11.6: 28.

$$\sum_{n=1}^{\infty} \left(\frac{-2n}{n+1}\right)^{5n} \quad \lim_{n\to\infty} \left| \left(\frac{-2n}{n+1}\right)^{5n\left(\frac{1}{n}\right)} \right| =$$

$$\lim_{n\to\infty} \left| 2^5 \left(\frac{n}{n+1}\right)^5 \right| > 1$$

It is divergent

11.8: 16 $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{(2n-1)2^n}(x-1)^n$

Let $u = x-1$

$$\lim_{n\to\infty} \left| \sqrt[n]{\frac{(-1)^n}{(2n-1)2^n} u^n} \right| = \lim_{n\to\infty} \left| \frac{-1}{\sqrt[n]{(2n-1)2^n}} u \right| =$$

$$= \lim_{n\to\infty} \left| \frac{u}{2\cdot \sqrt[n]{2n-1}} \right| =$$

$$\left| \frac{1}{2} u \right|$$

$-1 < \frac{1}{2} u < 1$

$-2 < u < 2$

$-2 < x-1 < 2$

$-1 < x < 3$

The radius is $3-(-1) = 4$

When $x=-1$, $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{(2n-1)2^n}(-2)^n = \sum_{n=1}^{\infty} \frac{1}{2n-1}$, which is divergent

When $x=3$, $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{(2n-1)2^n}(2)^n = \sum_{n=1}^{\infty} (-1)^n \frac{1}{2n-1}$, which is convergent.

The interval is $x \in (-1, 3]$

11.8: 20. $\sum_{n=1}^{\infty} \frac{(2x-1)^n}{5^n \cdot \sqrt{n}}$ let, $u = 2x-1$

$$\lim_{n\to\infty} \left| \sqrt[n]{\frac{(2x-1)^n}{5^n \cdot \sqrt{n}}} \right| = \lim_{n\to\infty} \left| \frac{u}{5 \cdot \sqrt[n]{\sqrt{n}}} \right| = \left|\frac{u}{5}\right| \lim_{n\to\infty} \left| \frac{1}{\sqrt[n]{\sqrt{n}}} \right| = \left| 1 \cdot \frac{u}{5} \right|$$

$$\left|\frac{u}{5}\right| < 1 \Leftrightarrow \left|\frac{2x-1}{5}\right| < 1 \Leftrightarrow -1 < \frac{2x-1}{5} < 1 \Leftrightarrow$$

$$-5 < 2x-1 < 5 \Leftrightarrow -4 < 2x < 6 \Leftrightarrow$$

$$-2 < x < 3$$

The radius is $3-(-2) = 5$

When $x=-2$, $\sum_{n=1}^{\infty} \frac{(2(-2)-1)^n}{5^n \cdot \sqrt{n}} = \sum_{n=1}^{\infty} \frac{(-5)^n}{5^n \cdot \sqrt{n}} = \sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt{n}}$,

which is convergent.

When $x = 3$, $\sum_{n=1}^{\infty} \frac{(6-1)^n}{5^n \cdot \sqrt{n}} = \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$, which is divergent

The interval is ~~$[-2, 3]$~~

$[-2, 3)$