Math 112
Homework 10 Solutions

Part 1

11.5 #4: $\lim_{k\to\infty}\left|\frac{a_{k+1}}{a_k}\right| = \frac{|x|}{3}$. Thus, the radius of convergence is $R = 3$.

11.5 #5: $\lim_{k\to\infty}\left|\frac{a_{k+1}}{a_k}\right| = |x|$. Thus, the radius of convergence is $R = 1$.

11.5 #10: The radius of convergence is $R = 1$ and the interval of convergence is $[-2, 0)$.

Part 2

11.5 #28: may converge

11.5 #30: cannot converge

11.5 #32: may converge

Part 3

11.6 #5: $f(x) = \sum_{k=0}^{\infty}(-1)^k x^{k+2}$, $I = (-1, 1)$ (substitute $z = -x$ and multiply by x^2)

11.6 #6: $f(x) = \sum_{k=0}^{\infty} kx^{2k}$, $I = (-1, 1)$ (substitute $z = x^2$)

11.6 #8: $f(x) = \sum_{k=0}^{\infty} x^{4k+1}$, $I = (-1, 1)$ (substitute $z = x^4$ and multiply by x)

11.6 #17: $f(x) = \frac{1}{2}\sum_{k=0}^{\infty}(-1)^k\left(\frac{x}{2}\right)^k = \sum_{k=0}^{\infty}(-1)^k\frac{x^k}{2^{k+1}}$, $I = (-2, 2)$