MATH 1B WEEK 7, TUESDAY

Check if the following series converge. Make sure to fully justify any theorems you use. (At least one of these is *not* a direct application of a rule we've learned, even though it may look like it.)

Exercise 1. $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots$

Exercise 2. $\sum_{n=2}^{\infty} \frac{1}{(n+1)(n-1)}$

Exercise 3. $\sum_{n=1}^{\infty} \sin\left(\frac{1}{n}\right)$

Exercise 4. $\displaystyle\sum_{n=1}^{\infty}(-1)^{n-1}\frac{1+\cos(\pi n)}{n}$

Exercise 5. $\displaystyle\sum_{n=0}^{\infty}\frac{2^n}{n!}$. (Recall $n! = 1\cdot 2\cdot 3\cdots n$)

Exercise 6. $\displaystyle\sum_{n=0}^{\infty}(-1)^{n-1}\frac{1\cdot 3\cdot 5\cdots(2n-3)}{2^n\cdot n!}$ (This is tricky. *Hint:* pair up terms in the numerator and denominator.)