QUESTIONS

1.) For which values of $x \in \mathbb{R}$, does the power series $\sum_{n=1}^{\infty} \dfrac{(x-4)^n}{2^n \cdot \sqrt[5]{n^3+7}}$ converge absolutely,

converge conditionally and diverge? **(40P)**

2.) $\sum_{n=1}^{\infty} \left(\dfrac{2}{3^{n+1}} + \dfrac{(-1)^n}{5^n} \right) = ?$ **(25P)**

3.) a) Write the definite polar integral(s) which gives the area of the region that lies **inside** the cardioid $r = 1 - \cos\theta$ and **outside** the circle $r = \cos\theta$.
(Sketch the graph) (DO NOT evaluate the definite integral(s))

   b) Write the definite polar integral(s) which gives the area of the region that lies **outside** the cardioid $r = 1 - \cos\theta$ and **inside** the circle $r = \cos\theta$.
(Sketch the graph) (DO NOT evaluate the definite integral(s))