Math Camp 2020 Summer
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# Homework 3 Solution

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| Derive the Taylor expansion for $f(x) = 3x^2 - 6x + 5$ |
| Derive the Maclaurin expansion for $e^{kx}, k\ is\ real\ number$ |
| Derive the Maclaurin expansion for $(1+x)^{\mu}$. |
| Derive the Maclaurin expansion for $\sqrt{1+x}$. |
| Find the convexity and concavity for function $f(x) = x^3 + ax + b$ |
| Find the intervals of convexity and concavity of the function $f(x) = \frac{1}{1+x^2}$ |
| Find the intervals of convexity and concavity of the function $f(x) = e^{\frac{1}{x}}$ |
| Find the sum of the series $S = 1 - \frac{1}{\sqrt{2}} + \frac{1}{2} - \frac{1}{2\sqrt{2}} + \frac{1}{4} - \frac{1}{4\sqrt{2}} + \frac{1}{8}$ |
| Redo the examples in class on your own: (1) $\sum_{n=1}^{\infty} \frac{3^n}{n^2}$ (2) $\sum_{n=1}^{\infty} \frac{n^3}{(ln2)^n}$ converges or diverges<br><br>(See class notes) |