- 1. (a) Find the Taylor Polynomial of degree 4 approximating $f(x) = e^x$ near x = 1.
- 2. (a) Does the following infinite series converge: ⁴/₉ + ²/₃ + 1 + ³/₂ + ...? Explain your reasoning.
 (b) Find the sum

$$\sum_{n=0}^{\infty} \frac{3^n + 5}{4^n}.$$

- 3. (a) True or False: A monotone sequence can not have both positive and negative values.
 - (b) If the following sequence converges, give its limit. If the sequence diverges, write "diverges". $\frac{2n+(-1)^n 5}{4n-(-1)^n 3}$
 - (c) Does the sequence $(-1)^n$ converge? What about the series $\sum_{n=0}^{\infty} (-1)^n$?
 - (d) Does the following series converge: $\sum_{n=1}^{\infty} \frac{\ln(n+1)}{n+1}$?
 - (e) Does the following series converge: $\sum_{n=1}^{\infty} \frac{\sin(n)+n}{n}$?
- 4. (a) Write a definite integral giving the length of the curve $r = \cos(x)$ from x = 0 to $x = \pi/2$.
 - (b) Write an integral that gives the volume of the region bounded by $y = \sqrt{x}$, x = 1, x = 3, and y = 1 rotated about the y-axis.
 - (c) Write an integral giving the area of one petal of the rose $r = 3\sin(2\theta)$ with $0 \le \theta \le \pi/2$.
 - (d) Find the center of mass of a thin, 10cm rod whose density is given by $\delta(l) = 3l$.