

Name: _____

Points: /25

1. Examine monotonicity and boundedness of the sequence

$$a_n = \frac{n+9}{n+7}.$$

Justify your answer.

Points: /4

2. Decide about the convergence of the sequence

$$\sum_{k=1}^{\infty} \frac{(2k)!}{3^k}$$

and justify your answer.

Points: /4

3. Find and sketch the maximal domain of

$$f(x, y) = \sqrt{4x + y + x^2}.$$

Then find contour lines at heights $-2, -1, 0, 1, 2$ and sketch them.

Points: /6

4. Compute ∇f for

$$f(x, y) = (x + y)e^{2x}.$$

Next, compute its derivative at point $(-1, 2)$ with respect to direction $(\frac{8}{17}, \frac{15}{17})$.

Points: /5

5. Use the second order Taylor polynomial in order to compute an approximate value of

$$e^{(2.1)^2 - (1.9)^2}.$$

Points: /6