Name:

Points: /25

1. Examine the monotonicity and boundedness of a sequence

$$a_n = \frac{\sqrt{n+3}}{n}.$$

Justify your answer.

Points: /5

2. Does the series

$$\sum_{n=1}^{\infty} \frac{\cos(k\pi/2)}{k^2+1}$$

converge or diverge? Justify your claim.

Points: /5

3. Evaluate

$$\sum_{n=1}^{\infty} \frac{2^{2n-3}+3^n}{12^{n-1}}.$$

Points: /6

4. Find contour lines at heights -2, -1, 0, 1, 2 for a function

$$f(x,y) = \frac{1}{x^2+y^2+3}$$

Points: /4

5. Compute $\nabla^2 f$ for

$$f(x,y) = x^2 + 3x - \frac{\sin(y)}{e^{xy}}.$$

Evaluate it in point $(0, \pi)$.

Points: /5