

Make up test – sample

1. Is the vector $w = (2, 1, -2)$ in the span of $u = (1, -1, 0)$ and $v = (1, 1, 2)$?

2. Compute the determinant of

$$A = \begin{pmatrix} 1 & 1 & 0 \\ -1 & 3 & 2 \\ 0 & 2 & 1 \end{pmatrix}.$$

3. Compute

$$\lim_{n \rightarrow \infty} \sqrt{n}(\sqrt{n+2} - \sqrt{n}).$$

4. Find the maximal domain of

$$f(x) = \frac{1}{1 - \log x}.$$

5. Compute f' and f'' for the function

$$f(x) = \frac{e^x}{x^2 + 1}.$$

6. Determine the intervals of monotonicity of

$$f(x) = x^3 - 3x.$$

7. Find the first partial derivatives of

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

8. Does the equation

$$xy - y^2 + 2y = 0$$

determine a function $y(x)$ in the neighborhood of $(-1, 1)$?