

Homework Assignment for Week 05

1. Section 3.2: problems 17, 48, 54, 57.
2. Read about second and higher order derivatives at end of section 3.3.
3. Section 3.3: problems 47, 55, 67, 70, 75(c).
4. Use product rule to show (and memorize) that

$$\begin{aligned}\frac{d}{dx} \begin{vmatrix} f_{11}(x) & f_{12}(x) \\ f_{21}(x) & f_{22}(x) \end{vmatrix} &= \begin{vmatrix} f'_{11}(x) & f_{12}(x) \\ f'_{21}(x) & f_{22}(x) \end{vmatrix} + \begin{vmatrix} f_{11}(x) & f'_{12}(x) \\ f_{21}(x) & f'_{22}(x) \end{vmatrix} \\ &= \begin{vmatrix} f'_{11}(x) & f'_{12}(x) \\ f_{21}(x) & f_{22}(x) \end{vmatrix} + \begin{vmatrix} f_{11}(x) & f_{12}(x) \\ f'_{21}(x) & f'_{22}(x) \end{vmatrix}\end{aligned}$$

What are the corresponding formulae for 3 by 3 determinants, 4 by 4 determinants, etc.?

5. Apply the product rule repeatedly to get $\frac{d^n}{dx^n}(u(x)v(x))$ in terms of derivatives of $u(x)$ and $v(x)$. Start with $n = 2$, then $n = 3, \dots$, to find the formula.