

## Homework 9

Due March 30th in class or by 3:20 pm in MATH 602.

1. Do problem 1 from page 16 of <https://www.math.purdue.edu/~dvb/preprints/diffforms.pdf>
2. Do problem 2 from page 16 of <https://www.math.purdue.edu/~dvb/preprints/diffforms.pdf>

3. Evaluate

$$\int_C \sin z dx + \cos(\sqrt{y}) dy + x^3 dz,$$

where  $C$  is the line segment from  $(1, 0, 0)$  to  $(0, 0, 3)$ .

4. Which of the following one forms can be written as  $df$  for some function  $f: \mathbb{R}^3 \rightarrow \mathbb{R}$ ? If the answer is yes, find such a function  $f$ .
  - (a)  $ydx + xdy + \sin z dz$ ,
  - (b)  $ydx - xdy + \sin z dz$ .

5. (a) Find a function  $f$  such that

$$df = yz dx + xz dy + xy dz.$$

- (b) Evaluate

$$\int_C yz dx + xz dy + xy dz,$$

where  $C$  is the parametric curve  $(\cos t, e^t, \ln t)$ ,  $1 \leq t \leq 2$ .