

Homework Set # 10

1. (§7.1) Page 356: # 10.
  2. (§7.2) Page 373: # 3(d), 4.
  3. If  $C$  is the curve  $y = x^2 + 4$  from  $(0, 4)$  to  $(2, 8)$ , compute the following:
    - (a) Path Integral:  $I = \int_C f ds$ , where  $f(x, y) = xy - x^3$ .
    - (b) Line Integral:  $J = \int_C \tilde{\mathbf{F}} \bullet d\tilde{\mathbf{s}}$ , where  $\tilde{\mathbf{F}}(x, y) = (1 + xy)\mathbf{i} - x\mathbf{j}$ .
    - (c) Line Integral (in differential form):  $K = \int_C 2xy dx + x dy$ .
  4. Evaluate the line integral  $\int_C \tilde{\mathbf{F}} \bullet d\tilde{\mathbf{s}}$ , where  $\tilde{\mathbf{F}}(x, y) = (2xy^3, \{3x^2y^2 - 4y\})$  and  $C$  is any smooth curve starting at  $(1, 0)$  and ending at  $(2, 2)$ .  
Hint:  $\tilde{\mathbf{F}}$  is a gradient field  $\tilde{\mathbf{F}}(x, y) = \nabla f(x, y)$ .
  5. (§7.3) Page 381: # 1.
  6. Do the following problems from the book:
    - (a) (§4.4) Page 259: # 23, 25.
    - (b) (§5.3) Page 288: # 1, 9.
    - (c) (§5.4) Page 293: # 5.
    - (d) (§5.5) Page 302: # 1.
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