Math 250B
Assignment 2

Deadline: Fri Dec 11, 2:30pm Pacific Time
Submit on D2L or email HowardL@camosun.ca

Number of Questions: 6
Total Marks: 20

Show all your work for full marks.
You MAY use the course website (notes, videos etc)
You may NOT copy from others (classmates, tutors, Chegg etc)

Submit jpg or pdf files
Feel free to handwrite your solutions and take photos of your work

Covers Sections 14.2-14.5

1. [3 marks] Let C be the **right half** of the circle $x^2 + y^2 = 9$. Evaluate $\int_C xy^2 \, ds$.

2. [4 marks] Let $\mathbf{F} = [y^2, 2xz, 1]$. Let C be the straight line segment from $(1, 2, 3)$ to $(19, 17, 15)$. Find the work done by $\mathbf{F}$ along C.

3. [3 marks] C is an unknown path from $(\pi, 3)$ to $(\frac{\pi}{2}, 8)$. Compute the following. If you cannot compute it without more information, say so.

a) $\int_C [(y \cos x - y^3 \sin x)dx + (\sin x + 3y^2 \cos x)dy]$

b) $\int_C [xe^{xy}dx + ye^{xy}dy]$

4. [3 marks] Let C be the positively-oriented parallelogram formed by $y = x + 1, y = x + 2, x = 1, x = 2$. Let $\mathbf{F} = [e^{\cos x} - y^2, xy + \sin(\ln y)]$. Use Green's Theorem to compute $\oint_C \mathbf{F} \cdot \mathbf{dr}$

5. [3 marks] Let C be the (positively-oriented) triangle with vertices $(2, 3), (5, 3), (2, 9)$. Let $\mathbf{F} = [\arctan y^3, x^2y + e^{\sin x}]$. Use the 2D Divergence Theorem to compute the (outward) flux of $\mathbf{F}$ across C.

6. [4 marks] Find the (upward) flux of $\mathbf{F} = [0, x^2 + y^2, 6z]$ across the surface with position vector $\mathbf{r} = [a \cos b, a \sin b, 2a \cos b + 7]$ for $0 \leq a \leq 3, \ 0 \leq b \leq 2\pi$.