

MATH 1710 Test #1

Tuesday 6 February 2007 (5:30-6:30 pm)

Time: 60 minutes

Name: _____ ID#: _____

INSTRUCTOR (please check one): ☐ BERRY (A01) ☐ KOPOTUN (A02)

Problem	1	2	3	4(a)	4(b)	5	6	TOTAL
MARK								

VALUE

- [10] 1. Evaluate the integral $\int_0^8 \frac{x-1}{\sqrt{x+1}} dx$ (SHOW ALL YOUR WORK AND SIMPLIFY YOUR ANSWER!)

Name: _____

ID#: _____

page 2

- [4] 2. SET UP (BUT DO NOT EVALUATE) integral(s) to determine the AREA of the region enclosed by the curves $y = \ln(x)$, $y = e^x$, $y = 1$ and $y = 4$.
- [NOTE: You may use the fact that the two curves $y = \ln(x)$ and $y = e^x$ never intersect.]

- [5] 3. SET UP (BUT DO NOT EVALUATE) integral(s) to determine the LENGTH of that portion of the curve given by $x = (y+1)\ln(y)$ which lies between the points $(0,1)$ and $(e+1,e)$:

Name: _____

ID#: _____

page 3

4. Set up (BUT DO NOT EVALUATE) integral(s) to determine the VOLUME of the solid of revolution obtained when the region enclosed by $4x^2 - y^2 = 4$ and $x = \sqrt{2}$ is revolved ABOUT THE LINE $x = -1$, using

[5] (a) the “washers” method :

[6] (b) the “cylindrical shells” method :

Name: _____

ID#: _____

page 4

- [5] 5. SET UP (BUT DO NOT EVALUATE) integral(s) to determine the minimum amount of WORK DONE to pump the oil, having a constant density ρ [kilograms per cubic metre] from a hemi-spherical tank (with horizontal planar top) of radius 2 metres, to a height 3 metres above the top of the tank. [You may ignore frictional forces.]:

- [5] 6. SET UP (BUT DO NOT EVALUATE) integral(s) to determine the TOTAL FLUID FORCE exerted on one face of a circular plate, of radius 3 metres which is immersed vertically into a fluid of density ρ [kilograms per cubic metre] so that the top of the plate is 1 metre ABOVE the surface of the fluid: