معهد بئر حسن الفني | العام الدراسي :2015 -2016

السنة : الأولى | امتحان الفصل الأول

الاختصاص : صيانة طائرات | المادة : رياضيات عامة

الفرع : إنكليزي | الوقت : ساعة ونصف

I- Integral in rectangular regions: (4-*pts*)

Consider the double integral: $I=\int_0^3\int_{-2}^0\left(x^2y-2xy\right)dydx.$

1. Determine the limits of x & y.
2. Draw the specified region of integration.
3. Prove that $I=-\dfrac{8}{3}$

II- Double integrals as volume: (4-*pts*)

Consider the region R enclosed between the straight lines $(d): y=x$, $(\Delta): x=0$ and $(l): y=-x+2$.

1. Determine the coordinates of A, the point of intersection of the straight lines (d) & (l).
2. Sketch the region R and plot the point A.
3. Consider the surface $z=f(x,y)=x^2+y^2$.
   a. Specify the limits of integration of the integral of: $V=\int\int_R f(x,y)dydx$
   b. Prove that: $V=\dfrac{448}{3}$
   c. What does the value V of represent?

III- Consider the region R bounded by the curves $y=x$ and $y=x^2$ (6-*pts*)

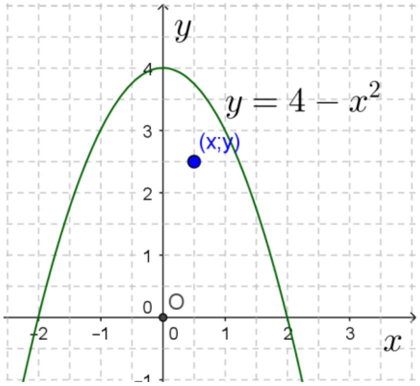
a. Draw the above region *R*.

b. Find the area of the region *R*.

c. Prove that the centroid of the given region *R* is of coordinates $(\frac{1}{2},\frac{2}{5})$.

IV- Consider the parabolic region $R: 0\le y\le 4-x^2$.

(See adjacent figure).(6-*pts*)



1) Recopy the given region and indicate the bounding curves.
2) Use double integration to evaluates the mass of the lamina: M of density function $\delta(x,y)=2x$
3) Use the above part to find the center of mass of the given lamina is of coordinates $\left(0;\dfrac{4}{3}\right)$.

Good work