معهد بئر حسن الفني	العام الدراسي: 2014 -2015
السنة : الأولـى	إمتحان الفصل الأول
الاختصاص : صيانة طائرات	المادة : رياضات عامـة
الفرع : إنكليزي	الوقت : ساعة ونصف

Answer ***three*** out of the four given questions:

I- Consider the region R bounded by the curves $y = x$ and $y = x^2$ (7-*pts*)

a. Draw the above region R.

b. Find the area of the region R.

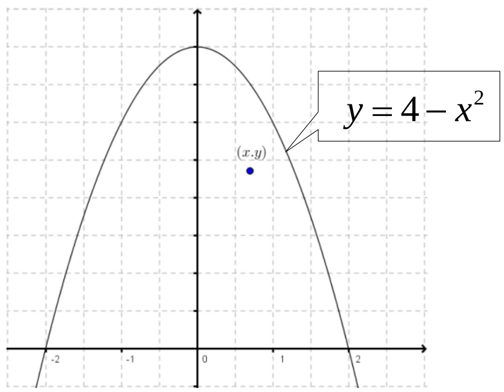
c. Prove that the centroid of the given region R is of coordinates $(\frac{1}{2}, \frac{2}{5})$.

II- Consider the parabolic region $R: 0 \le y \le 4 - x^2$.
(See adjacent figure).(7-*pts*)

a. Recopy the given region and indicate the bounding curves.

b. Use double integration to evaluates the mass of the lamina: M of density function $\delta(x, y) = 2x$

c. Use the above part to find the center of mass of the given lamina is of coordinates $\left(0; \frac{4}{3}\right)$.



III- Sketch then calculate the integral I bounded by a rectangular region: (6-*pts*)

$$I = \int_0^3 \int_0^2 (4 - x^2) dy dx.$$

IV- A solid right (non-circular) cylinder has its base R in the xy-plane and is bounded from above by the paraboloid: $z = x^2 + y^2$.(6-*pts*)

a. Sketch the region R in the xy-plane: which is enclosed by the lines $y = x,\ x = 0$ & $x + y = 2$.

b. Express the volume of the region that lies under the paraboloid and above the region R, by a double integral.

c. Prove that the volume of this region is: $V = \frac{4}{3} units^3$.(***Note***: $(a-b)^3 = a^3 - 3a^2b + 2ab^2 - b^3$)

Good Work.