

Centre of Mass - Exercises (3 pages; 7/8/17)

(1) Centre of Mass of Lamina by Integration

Find the centre of mass of a semi-circular lamina of radius r .

(a) by integrating wrt x

(b) by integrating wrt y

(2) Centre of mass of solid of revolution

The region between the curve $y = x^3 - x^2$ and the x -axis is rotated by 360° about the x -axis. Find the centre of mass of the solid of revolution obtained.

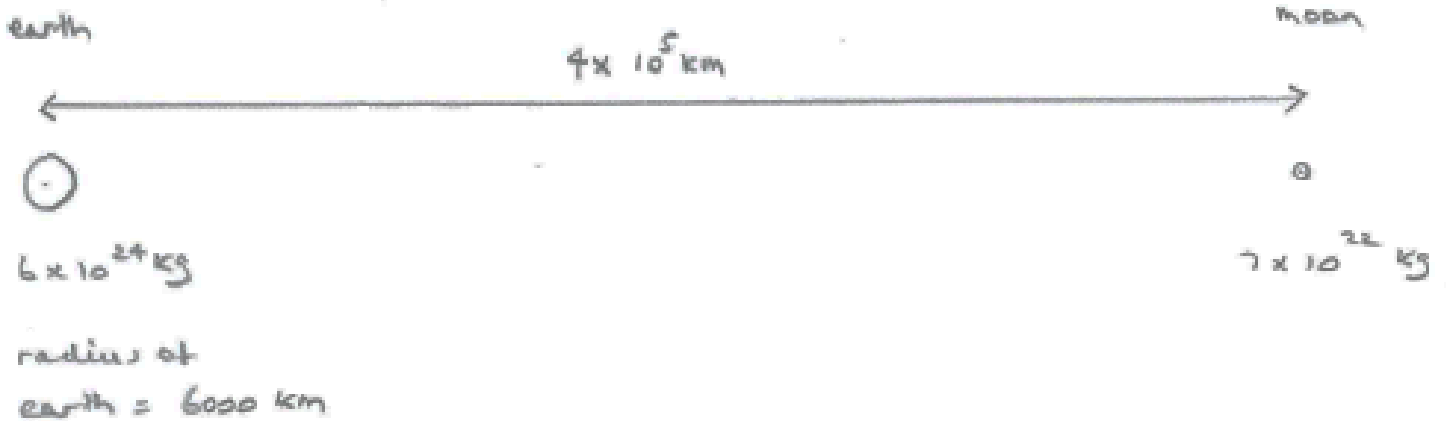
(3) Centre of mass of lamina

Find the centre of mass of the region between the curve

$y = x^3 - x^2$ and the x -axis.

(4) Show that the centre of mass of a parallelogram is at the intersection of the diagonals, by finding the centre of mass of two triangles, given the result that the diagonals bisect each other.

(5) Find the centre of mass of the Earth-Moon system



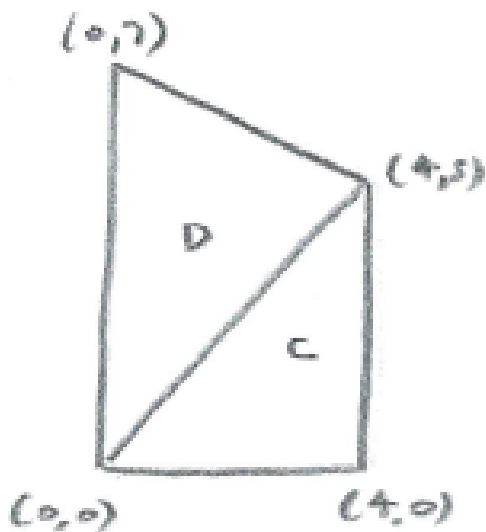
distance from earth to moon = $4 \times 10^5 \text{ km}$

radius of earth = 6000 km

mass of earth = $6 \times 10^{24} \text{ kg}$

mass of moon = $7 \times 10^{22} \text{ kg}$

(6) Find the centre of mass of the trapezium in the diagram, by dividing it up as shown.



(7) Find the centre of mass of the semi-circular lamina shown in the diagram.

