School of Mathematics

UMA003: Mathematics-I, (Tutorial Sheet 02)

(1) What is the largest area for a right triangle whose hypotenuse is $5cm$ long?

(2) It costs c dollars each to manufacture and distribute backpacks. If the backpacks sells at x dollars each, the number sold is given by $n = \frac{a}{(x-c)} + b(100 - x)$, where a and b are certain positive constants. What selling price will bring a maximum profit?

(3) The height of a body moving vertically is given by $s = s_0 + v_0t - \frac{1}{2}gt^2$ with s in meters and t in seconds. Find the body's maximum height?

(4) What values of a and b make $f(x) = x^3 + ax^2 + bx$ have

  (i) local maximum at $x = -1$ and local minimum at $x = 3$.

  (ii) local minimum at $x = 4$ and point of inflection at $x = 1$?

(5) Sketch the following polar curves

  (a) $r = 1 - \sin\theta$ (b) $r = 1 + \cos\theta$ (c) $r = 1 + 2\sin\theta$

  (d) $r = 2 + \sin\theta$ (e) $r^2 = \cos\theta$ (f) $r = \cos\frac{\theta}{2}$ (g) $r = \sin 2\theta$

(6) Find the points of intersection of the pair of polar curves

  (a) $r = 2\sin\theta$ and $r = 2\sin 2\theta$ (b)$r = \cos\theta$ and $r = 1 - \cos\theta$

(7) Find the maximum width of the petal of four leaved rose $r = \cos 2\theta$ which lies along x-axis.