National Junior College Mathematics Department 2015 National Junior College 2016 – 2017 H2 Mathematics Commented [BACA1]: Change the year here and in header NATIONAL Applications of Integration (Area and Volume) Assignment 2 Time Spent: Name: \_ Class: 1ma2\_ / 1IPma21\_ / 1IPma22\_ Subject Tutor: \_ **Suggested Duration: 40min** You are advised to use only MF26, and complete this assignment in one sitting. The region A is bounded by the curve  $y = \frac{1}{x^2}$  and the lines y = x, y = 4 and x = 0. 1 Find the area of region A. [3] (i) Find the exact volume formed when region A is rotated through  $2\pi$  radians about the (ii) Commented [BACA2]: Non italic pi [4] y-axis. The region R is bounded by the axes and the part of the curve  $y^2 = 4a(a - x), a > 0$ , lying in 2 the first quadrant. Find, in terms of a, (i) the area of R, [3] the volume,  $V_x$ , of the solid formed when R is rotated completely about the x-axis. [3] (ii) The volume of the solid formed when R is rotated completely about the y-axis is  $V_y$ . (iii) Show that  $V_y = \frac{8}{15}V_x$ . [3] The region S, lying in the first quadrant, is bounded by the curve  $y^2 = 4a(a - x)$  and the lines x = a and y = 2a. Find, in terms of a, the volume of the solid formed when S is rotated completely about the y-axis. [2] 3 A curve has parametric equations  $x = 1 + 2\sin\theta$ ,  $y = \cos\theta$ , where  $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$ . Sketch the curve, labelling clearly any intercepts with the axes. (i) [3] (ii) Find the exact area of the region bounded by the curve, the line x = 2, and both the xand y- axes. [4]