

MATHEMATICS ENRICHMENT CLUB.
Problem Sheet 5, June 4, 2013

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- Express the number 504504504 : as a fraction in lowest terms.
- Yvonne and Znonimir play a game. They have a pile of 500 counters and each is allowed to remove 1,2,4,8,... counters from the pile, taking turns in so doing. The last person to take a counter loses. Assuming that both play using the best possible strategy at each go, who wins?
- The last digit of 1997^{1997} is
(a) 1 (b) 3 (c) 5 (d) 7 (e) 9:
- How many planes of symmetry has a rectangular box of dimensions 2×3 ?
- (a) Paul measured all 6 edges of a tetrahedron ABCD and found them to be 1,3,4,5,6,8 cm. Can this be correct?
(b) Paul then measured the edges to be 2,3,4,5,6,8. $AB = 2$ what is the length of CD?
- (a) Prove that the angle in a semicircle is right-angle.
(b) Show that if two chords of a circle mutually bisect each other, then they are both diameters.
(c) Complete the following statement: If a parallelogram is inscribed in a circle then

Senior Questions

- Put $x = z - \frac{1}{z}$ and hence solve, in surd form, the cubic $x^3 + 3x = 1$:
- Let ABC be a triangle with three medians intersecting at S. Let L; M be the midpoints of AC, AB respectively.
(a)