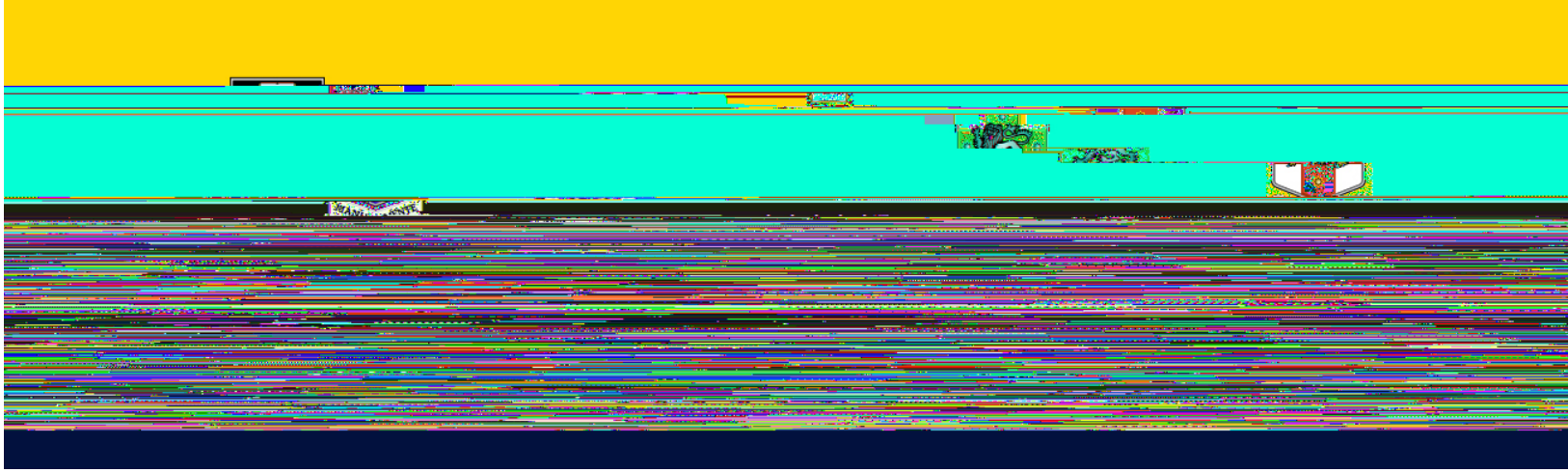

Solution Sheet 13, August 20, 2012

Answers

1. $2083\frac{1}{3}$ profit
2. Pi *z z a*
3. Construct a triangle ABD with sides of length a, b, d such that $\sphericalangle ADB = 90^\circ$. Show that $d = c$.
4. $$31^{24} < 32^{24} = 2^{5^{24}} = 2^{120} = 2^{8^{15}} = 256^{15} < 257^{15}$$
5. (a) Conjecture that $S_n = 2^n(2n-1)(2n-3)\cdots(5)(3)(1)$ - that is, 2^n times all the odd numbers from $2n-1$ down to 1. Since every factor aside from 2^n is odd, the power of 2 in the prime factorisation is n.

   (b) First prove $S_n = 2(2n-1)S_{n-1}$. Use this to prove our conjecture.