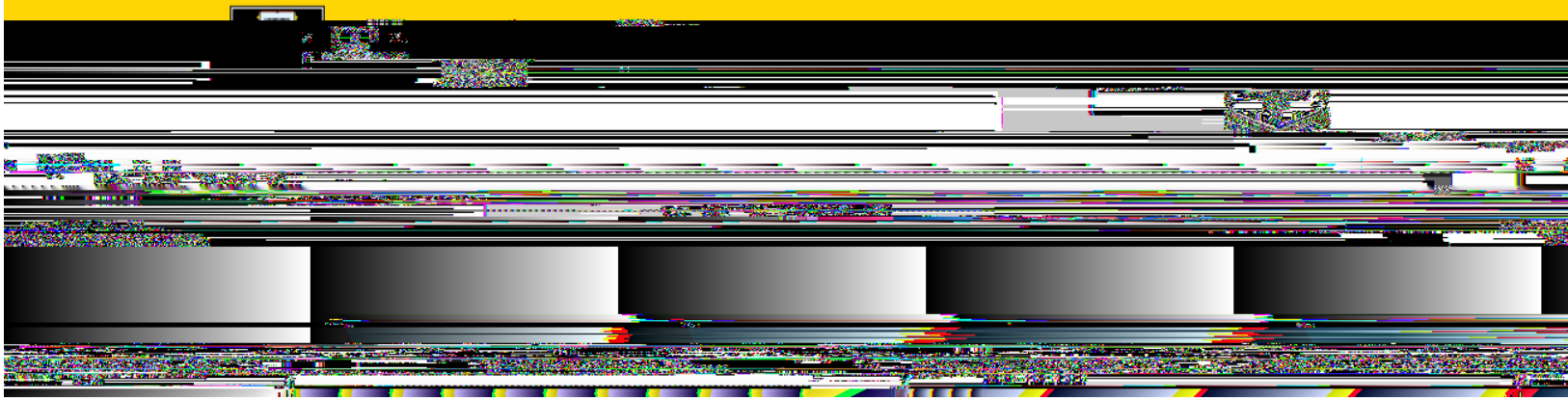

Solution Sheet 12, August 2, 2012

Answers

1. For the numbers between 1000 and 1999, x the most signi cant digit. If we cound just the number of ways we can have double zero and one other digit, then we get 27 possibilities. Similarly for double $2; 3; 4;$ 9.

   Counting the number of ways we can have two 1's is di erent, since we already have a one. If we count the number of ways we can have exactly one 1 and two other digits, then we get 297 possibilities.

   Some of these numbers have already been counted (1100 for example), so we must take away 3 9 = 27 possibilities that have been double counted.

   Brute-force counting tells us there are 11 possibilities between 2000 and 2012.

   Hence there are 8 27 + 297 27 + 11 = 497 such numbers.

2. $\frac{1}{100}$

3. (a)
$$\frac{1}{3}\sqrt{7} = \frac{1}{6}\sqrt{\frac{7}{18}}$$

   (b)
$$\frac{1}{3}\sqrt[3]{7}\,9 + 3\sqrt[3]{\qquad\qquad} \qquad 20 + \frac{3\sqrt[3]{7}}{20} + \frac{\sqrt[3]{49}}{20}$$

4. (a) easy

   (b) $(a; b; c) = (3; 11; 13); (1; 11; 17); (5; 7; 15); (1; 7; 26); (5; 5; 19); (3; 5; 25); (1; 5; 35); (1; 3; 53); (1; 1; 10$