**Solution**:

All books are identified by an **International Standard Book Number (ISBN)**, a 10-digit code X1X2 . . . X10, assigned by the publisher. (This system will change in 2007 when a new 13-digit code will be introduced.) These 10 digits consist of blocks identifying the language, the publisher, the number assigned to the book by its publishing company, and finally, a 1-digit check digit that is either a digit or the letter X (used to represent 10). This check digit is selected so that and is used to detect errors in individual digits and transposition of digits.

1. The ISBN of the fifth edition of Elementary Number Theory and Its Applications is 0-32-123Q072, where Q is a digit. Find the value of Q. (Textbook [KR] Page 210: 34)  
     
   ***Answer***: We know that 1 ∙ 0 + 2 ∙ 3 + 3 ∙ 2 + 4 ∙ 1 + 5 ∙ 2 + 6 ∙ 3 + 7 ∙ Q + 8 ∙ 0 + 9 ∙ 7 + 10 ∙ 2 ≡ 0 (mod 11). This simplifies to 127 + 7Q ≡ 0 (mod 11). We subtract 127 from both sides and simplify to 7Q ≡ 5 (mod 11), since -127 = -12 ∙ 11 + 5. It is now a simper matter to use trial and error (or the methods to be introduced in Section 3.7) to find that Q = 7 (since 49 ≡ 5 (mod 11)).