Chapter 16: Identification Numbers

Section 16.1 Check Digits
(U.S. Postal Service Money Order)

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Chapter 16: Identification Numbers

- **Identification Numbers**
  - Modern identification numbers serve at least two functions:
    1. The number should unambiguously identify the person or thing with which it is associated .
   2. The number should have a "self-checking" aspect.

- **Code**
  - A group of symbols that represent information.
  - Codes have been invented for storing, securing, and transmitting information.
  - Examples: Hieroglyphics, the Greek alphabet, Roman numerals, Morse code, and the "genetic code" used to describe DNA

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Check Digits

- Check Digit
  - A digit included in an identification number for the purpose of error detection.
    - Mathematical calculations or schemes are used on the digits of the identification number to assign the check digit.
    - Computers use the check digit to help detect typing errors during data entry to prevent and detect fraud and to find other errors.

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❑ **<u>U.S. Postal Service money order</u>** with identification number 6302438384 and check digit 5.
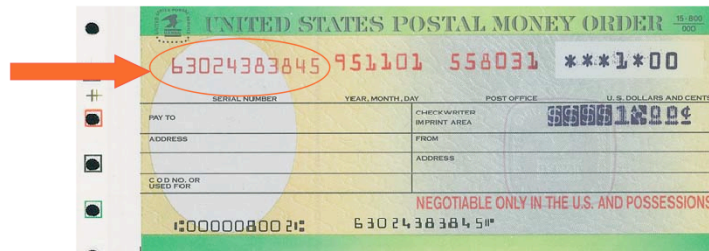
❑ The check digit in this case is the *calculated remainder after dividing the sum of the first ten digits by 9.*

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Example: Postal Service Money Order

The check digit = the remainder obtained when the sum of
the first 10 digits of the number is divided by 9

$6+3+0+2+4+3+8+3+8+4=41$

The remainder when 41 is divided by 9 is 5.

Remarks on remainder

Example: 418 divide by 7

If you plug this problem into a calculator, you'll get 59.7143.

Doing it using long division, you can work it out this way:

```
        59 R 5
   7 )418
     −35
       68
     − 63
        5
```

The R stands for 'remainder.' That is, the number to the right of the R is the remainder of this division.

Example:
Suppose a U. S. Postal Service money order is numbered 632930421#, where the last digit is obliterated. What is the missing digit?

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Example:

Suppose a U. S. Postal Service money order is numbered 632930421#, where the last digit is obliterated. What is the missing digit?

Solution:

$6 + 3 + 2 + 9 + 3 + 0 + 4 + 2 + 1 = 30$

When 30 is divided by 9, the remainder is 3. The 11th digit (Check Digit) is then 3.

http://www.math.upenn.edu/~deturck/m170/wk1examples/calc.html