1 Introduction

Let a 2 digit number be represented as \(ab\)

\[ v = 10a + b \]  

(1-1)

where \(v\) is the value. For example for the number 23, \(a = 2\) and \(b = 3\). These problems have to be carefully formulated so that \(a\) and \(b\) are integers from 0 to 9.

The unknowns are \(a\) and \(b\).

2 Problems

2.1 Problem 1

The sum of the digits of a two digit number is 12. The tens digit is twice as large as the ones digit. What is the number?

\[12 = a + b\]  

(2-2)

\[a = 2b\]  

(2-3)

You have two equations in two unknowns. First solve for \(b\) by substituting the second equation into the first

\[12 = 3b\]  

(2-4)

\(b = 4\) and \(a = 8\) so the number is 84.

2.2 Problem 2

The sum of the two digits is 3. The difference is 1. What is the number?

\[3 = a + b\]  

(2-5)

\[a - b = 1\]  

(2-6)

Solve for \(a\) using the second equation

\[a = 1 + b\]  

(2-7)

\[3 = 1 + 2b\]  

(2-8)

\(b = 1\) and \(a = 2\) so the number is 21.