1 Introduction

Let a 2 digit number be represented as ab

$$v = 10a + b \tag{1-1}$$

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?

$$12 = a + b \tag{2-2}$$

$$a = 2b \tag{2-3}$$

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

$$12 = 3b \tag{2-4}$$

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?

$$3 = a + b \tag{2-5}$$

$$a - b = 1 \tag{2-6}$$

Solve for a using the second equation

$$a = 1 + b \tag{2-7}$$

$$3 = 1 + 2b \tag{2-8}$$

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