Problem

a) I have two digits, I am less than 30, and both 8 and 4 divide me evenly (exactly). The sum of my digits is greater than 6. Who am I?

b) I am greater than 30 but less than 50, and both 7 and 2 divide me evenly. Who am I?

Extensions:

1. I have three digits whose sum is 12. I am less than 200, and evenly divisible by 11. Who am I?

2. Make up your own number clue question. Then find a partner and challenge one another to make sure your clues actually do lead to the number you think they should. Exchange problems with other classmates.
Hints

Part a)

**Hint 1** - What does ”divide me evenly” mean?

**Hint 2** - Do you have to check divisibility by both 4 and 8? Why/or why not?

Part b)

**Hint 1** - If a number has both 2 and 7 as factors, what other number must also be a factor?

_Suggestion:_ Students may approach these problems in different ways, the simplest of which is to write down all the multiples of 4 and 8 in part a), and of 7 and 2 in b). It would perhaps be worthwhile to do a) together as a class, and discuss why the desired number need only be divisible by 8.
Solution

a) The only two-digit numbers less than 30 and divisible by both 4 and 8 are 16 and 24. Since the sum of the two digits must be greater than 6, the number must be 16.

b) The only number greater than 30 and less than 50, divisible by both 7 and 2 (i.e., by 14) is 42.

Extension:

The three-digit multiples of 11 which are also less than 200 are 110, 121, 132, 143, 154, 165, 176, 187, and 198. The one with digits having a sum of 12 is 165.