1. This week's Problem of the Week in Math is described as follows:

> *There are thirty positive integers less than 100 that share a certain property. Your friend, Blake, wrote them down in the table to the left. But Blake made a mistake! One of the numbers listed is wrong and should be replaced with another. Which number is incorrect, what should it be replaced with, and why?*

The numbers are listed below.

6	10	14	15	21
22	26	33	34	35
38	39	46	51	55
57	58	62	65	69
75	77	82	85	86
87	91	93	94	95

Use the fact that the "certain" property is that these numbers are all supposed to be the product of *unique* prime numbers to find and fix the mistake that Blake made.
Reminder: Code your solution in an `R` script and copy it over to this `.Rnw` file.
Hint: You may find the `%in%` operator and the `setdiff()` function to be helpful.

Solution: To find the solution I first created a vector of the correct data set using the rule given and removed all redundant values, and values greater than 100, then sorted the data set in increasing order to match the given set. Then I created a vector using the given data set then compared the two vectors to find where they do not match. The value of where they do not match in the given data set is the error and the value where they do not match in the correct data set is the correct answer.

```
## Create the real set as a vector
primes = c(2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47)
prime.products = c()
for(i in 1:length(primes)){
  prime.products = c(prime.products, primes[i]*primes[-i])
}
prime.products = prime.products[-which(prime.products>100)]
prime.products = unique(prime.products)
prime.products = sort(prime.products)

## Create the given set as a vector

given.products = c(6, 10, 14, 15, 21, 22, 26, 33, 34, 35, 38, 39, 46, 51, 55, 57, 58, 62, 65, 69,
                   75, 77, 82, 85, 86, 87, 91, 93, 94, 95)

## See where given.products does not equal prime.products to find the error

error = given.products[which(prime.products!=given.products)]
print(paste("The error is: ", error))


[1] "The error is:  75"


print(paste("The right answer is: ", prime.products[which(given.products==75)]))


[1] "The right answer is:  74"
```