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:

```r
## 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"
```

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

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