Name: _____

Directions: **Work only on this sheet** (on both sides, if needed); do not turn in any supplementary sheets of paper. There is actually plenty of room for your answers, as long as you organize yourself BEFORE starting writing.

1. This problem concerns the file **bookvec.R** in our handout.

(a) (35) Suppose we create a new object **z** of type **"bookvec"**, and then execute

```
z[2] <- z[2]
```

Name the functions in **bookvec.R** that are executed in these two actions (object creation, assignment).

(b) (35) One of the comments says, "note the recycling." Give a specific illustration of recycling in the line associated with that comment, involving the object **b** in the examples in the handout, **and explain why**.

No "snow jobs," please; be specific. Your answer must be in similar form to

> If we execute
>
> ```
> > x <- b[1]
> ```
>
> then the vector (6,1,9) will be recycled to (6,1,9,6,1).

(c) (30) Write a function **sum.bookvec()** that will "overload" R's generic **sum()** function. It will return the sum of counts of writes, e.g.

```
> b <- newbookvec(c(5,12,13))
> b[2] <- 8
> b[2] <- 88
> b[3] <- 168
> sum(b)
[1] 3
```

You are allowed a maximum of 5 lines of code.

Solutions:

1.a

```
newbookvec()
[.bookvec
[<-.bookvec
```

1.b If we execute

```
> b[2:4] <- 7
```

the one-element vector 1 will be recycled to (1,1,1).

1.c

```
sum.bookvec <- function(bv,na.rm=F) sum(bv$wrts)
```

(Don't worry about the **na.mr=F**.)