

```
x<-c(22,20,19,24,25,25,28,22,30,27,24,18,16,19,19,28,24,25,25,23)  
y<-c(24,22,19,22,28,26,28,24,30,29,25,20,17,18,18,28,26,27,27,24)
```

```
wilcox.test(x,y,alternative="less",paired=TRUE)
```

wilcoxon signed rank test with continuity correction

```
data: x and y  
V = 18, p-value = 0.004287  
alternative hypothesis: true location shift is less than 0
```

```
wilcox.test(x,y,alternative="two.sided",paired=TRUE)
```

wilcoxon signed rank test with continuity correction

```
data: x and y  
V = 18, p-value = 0.008574  
alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(x,y,alternative="greater",paired=TRUE)
```

wilcoxon signed rank test with continuity correction

```
data: x and y  
V = 18, p-value = 0.9963  
alternative hypothesis: true location shift is greater than 0
```

default subtraction order in R here is  $x-y$ , not  $y-x$  which affects the direction of the one-tailed test.

you'll get different answers if you leave off `paired`  
default is ~~two~~-tailed

you can better account for the sign of the one-tailed test  
by subtracting just yourself.