STA 309 Homework 1

1. Probability Problems:
    a. Probability that the sum is < 7 = 41.7%
        i. Probability by counting
    b. P(80|70) = 37.1%
        i. $P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{0.23}{0.62}$, because everyone who turns 80 also turned 70
    c. P(Savings|Checkings) = 27.4%
        i. $\frac{0.17}{0.62}$, P(A,B) = both, P(A) = checking account
    d. P(Neither) = 12.0%
        i. $P(Neither) = (1 - checking) * (1 - savings) * (1 - both)$
    e. Proportion of Savings but not Checking = 34.8%
        i. $\frac{P(Savings)}{P(Checkings + P(Savings) - P(Both))}$

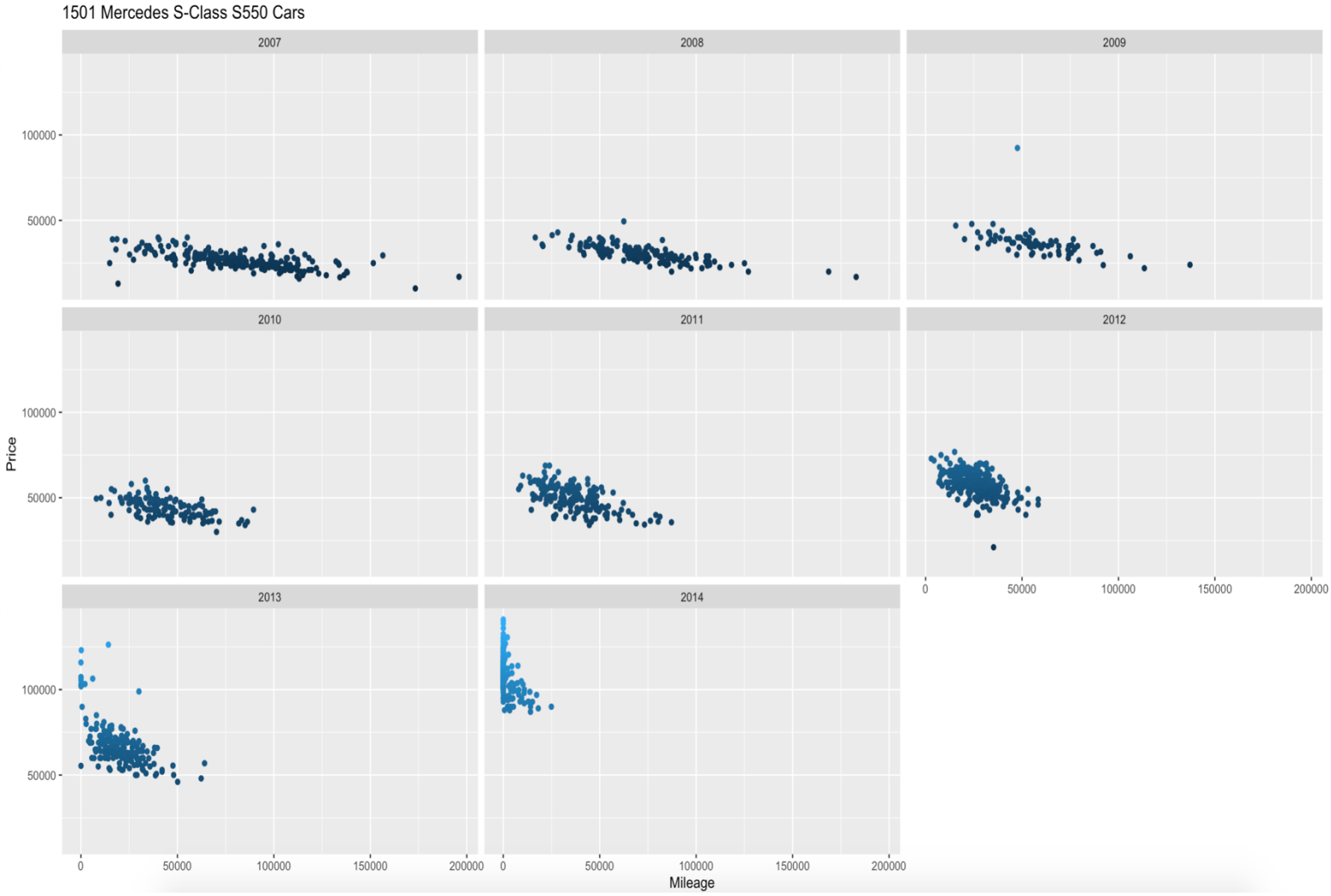
2. Plays Top 50
    a.

bob.dylan	the.beatles 0	1
0	0.787	0.143
1	0.035	0.034

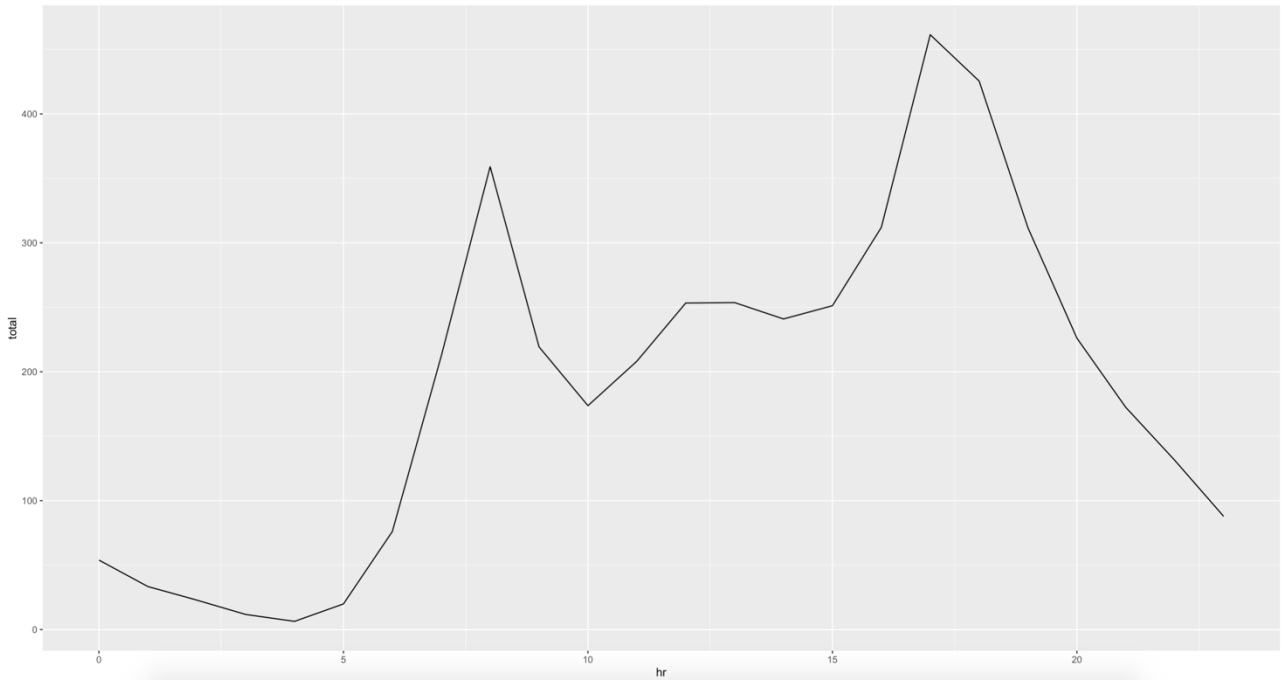
3. Random Clicker
    a. P(YES|TC) = 74.1%
        i. $\frac{(1 - P(RC)) * (0.65 * 1 - P(RC))}{(.50 * P(RC)) + (.30 * P(1 - RC))}$

4. Texas SOS
    a. P(SOS|Positive) = 98.96%
        i. $\frac{P(SOS) * P(Positive)}{((P(Positive)) + (1 - P(Negative))) * P(SOS)}$

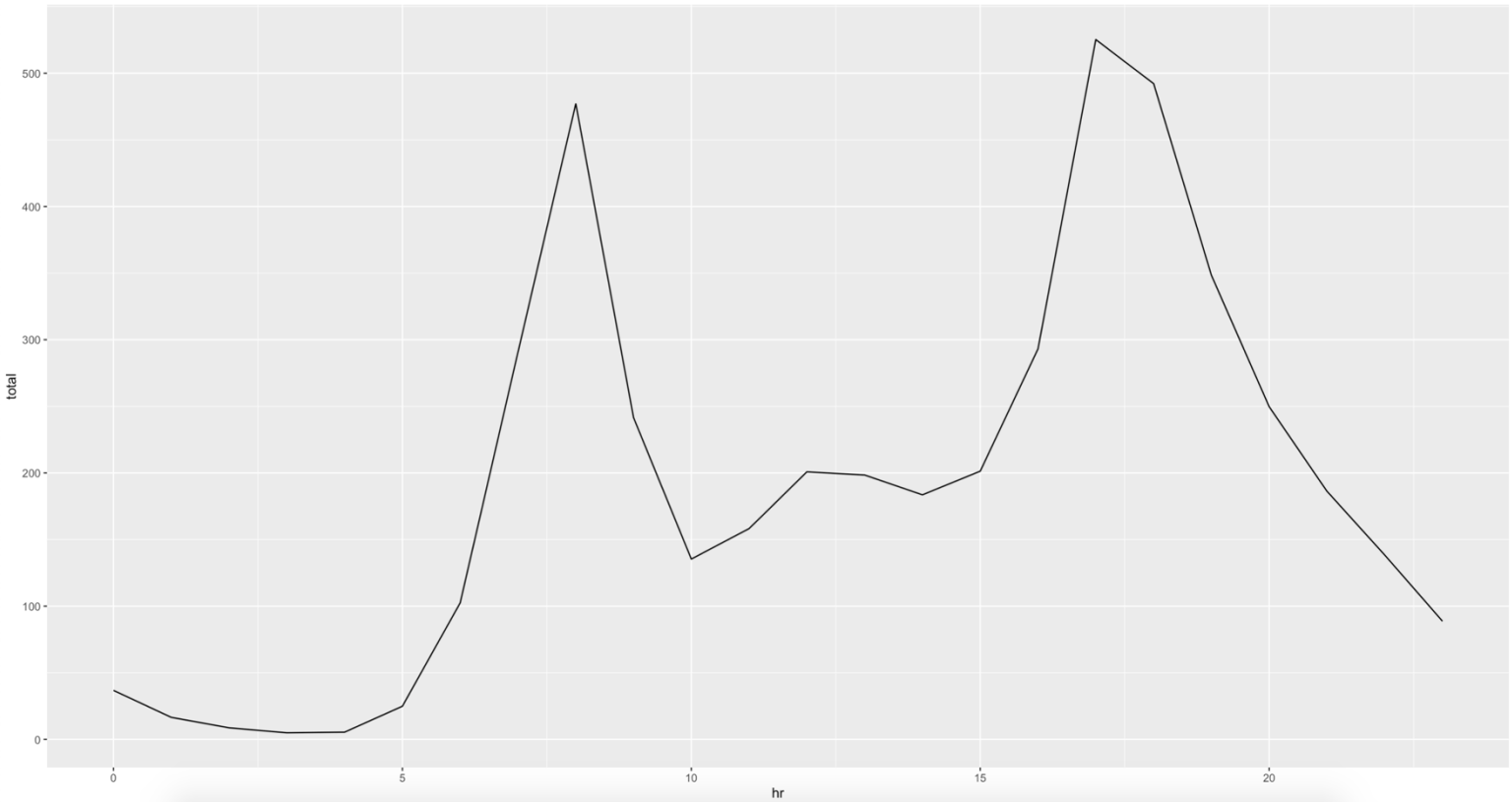
5. S550


1501 Mercedes S-Class S550 Cars
2007
2008
2009
2010
2011
2012
2013
2014
Price
Mileage
price
100000
50000
0
50000
100000
150000
200000
10000

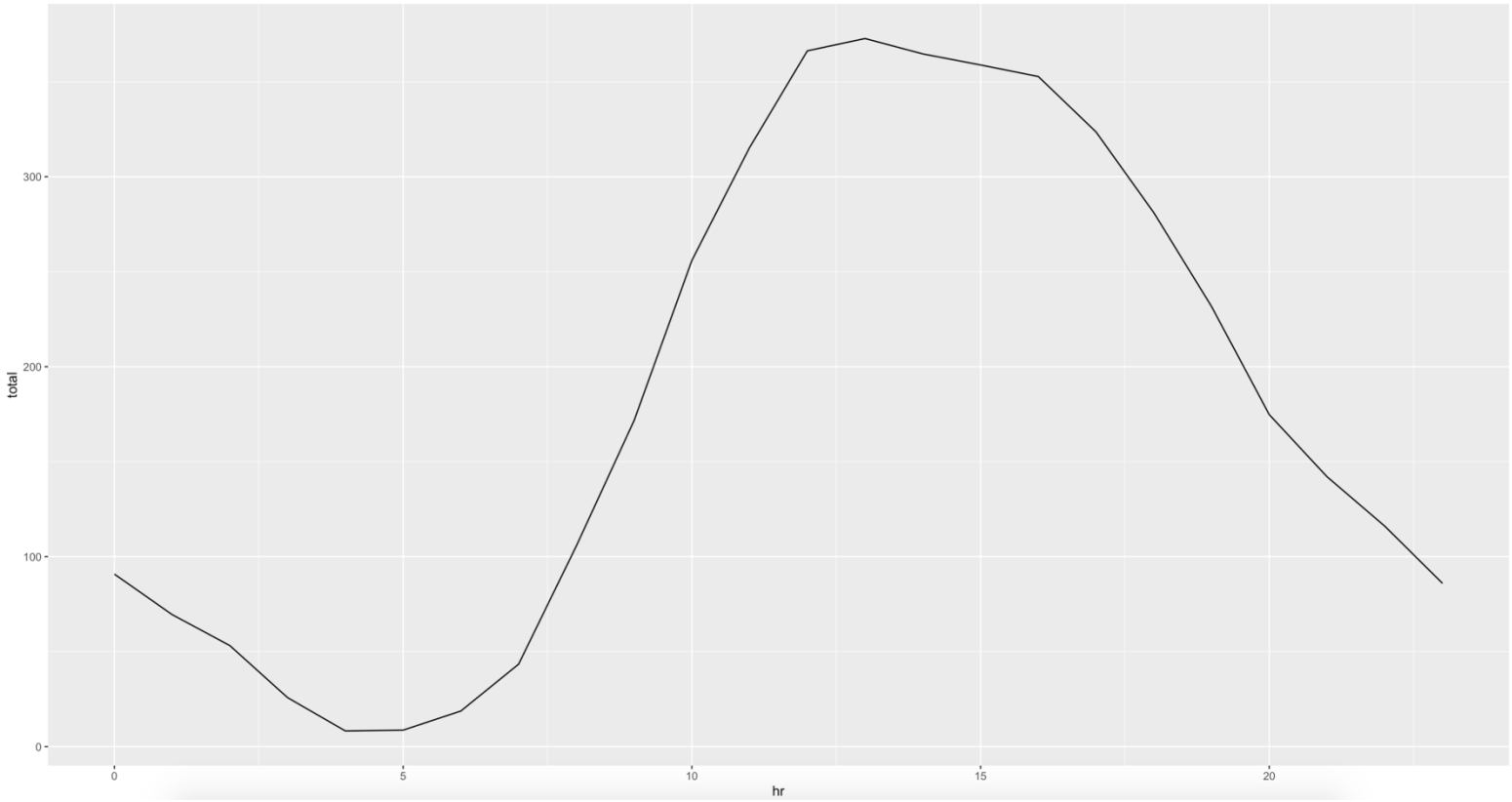
6. Bikeshare



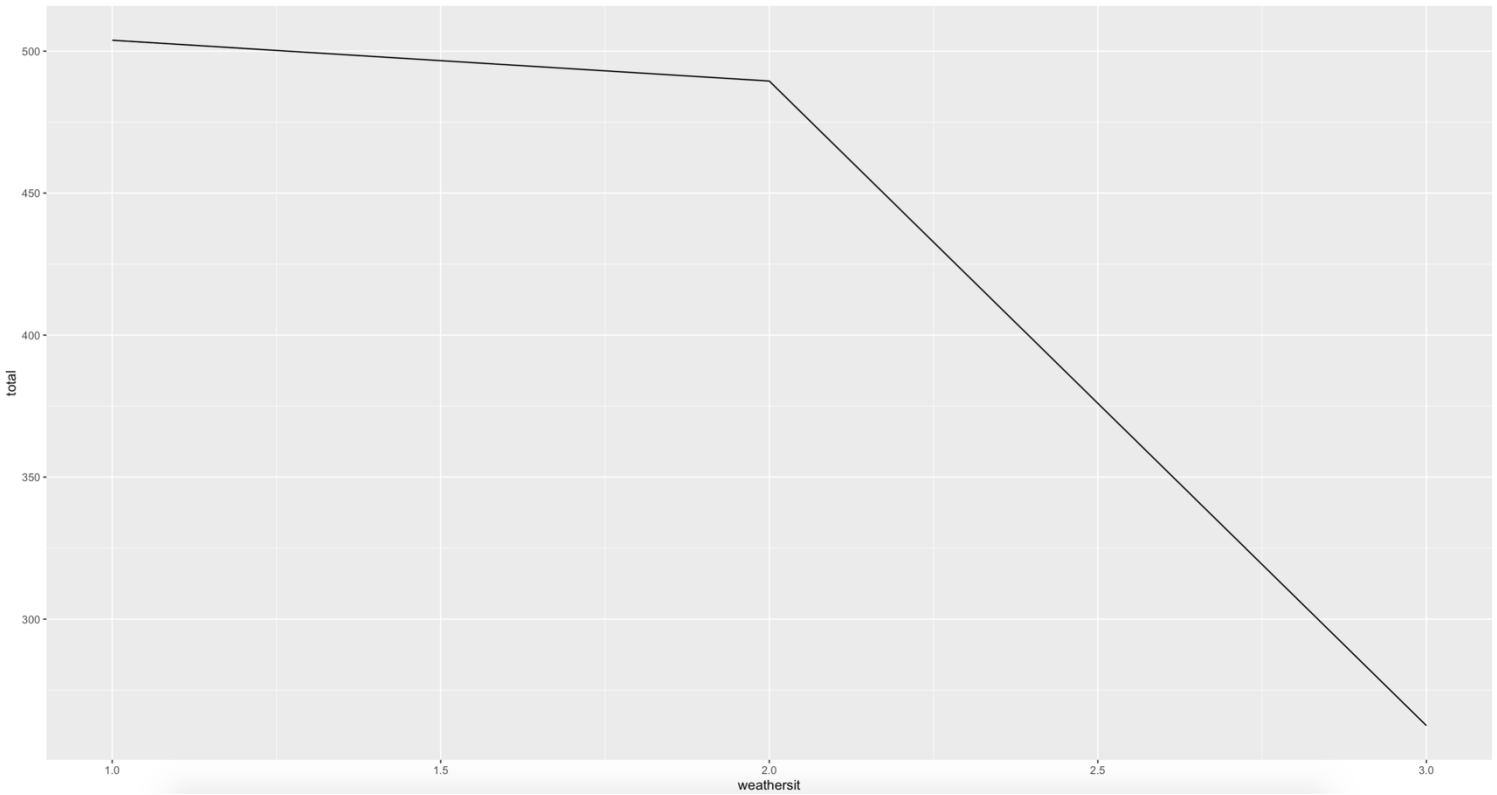
a. Average total per hour, graph 1



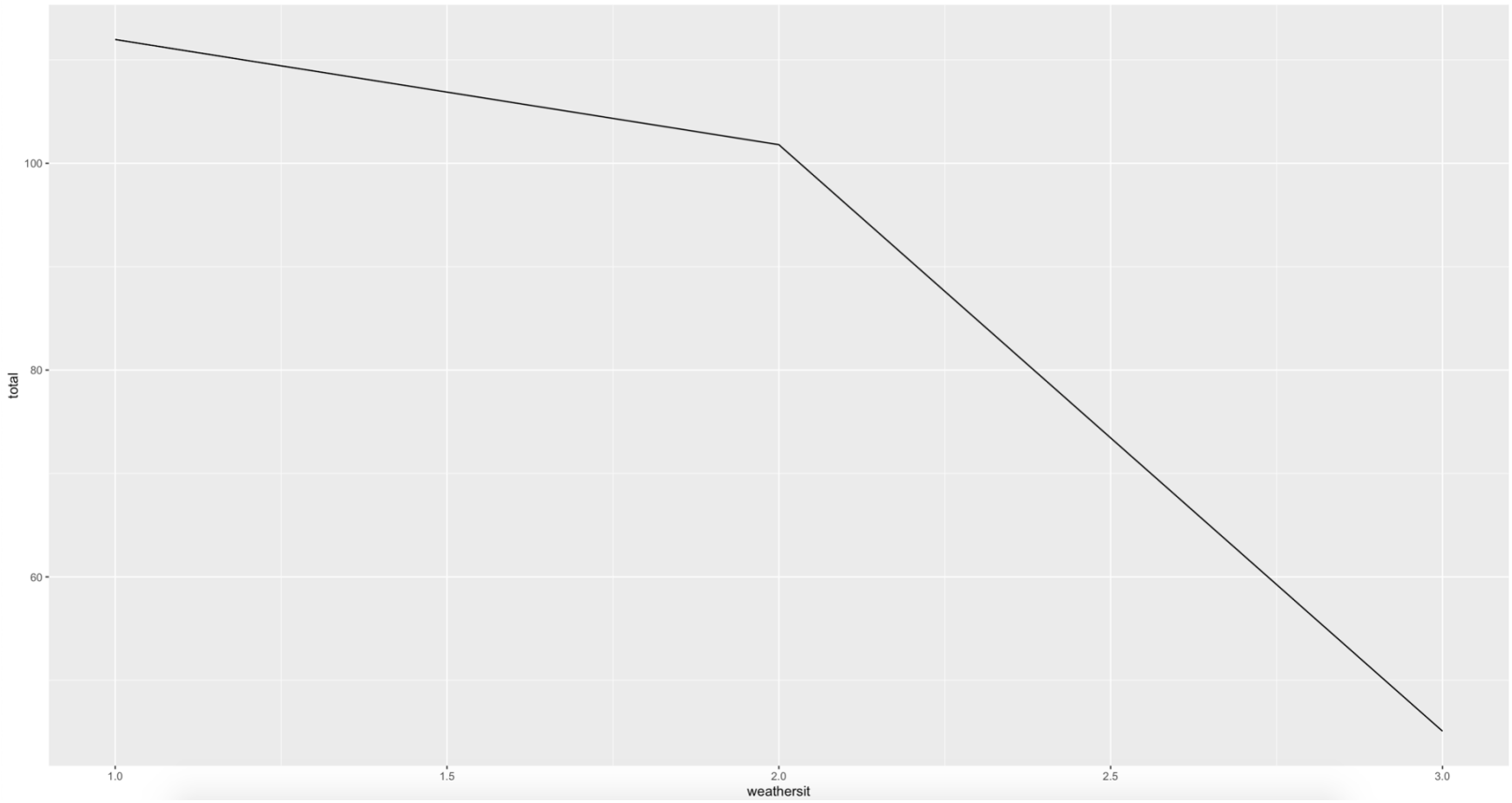
b. Average total on working days



c. Average total on Non-Working Days



d. Average total by weather situation on working days



e. Average total by weather situation on non-working days

f. Thoughts:

   i. Plot A: The times seem appropriate (i.e. people use the service in the early morning, presumably to go to work, and leave around 8 hours later).

   ii. Plot B: Seems to be an accurate representation of what plot A showed, when people have work (around 8AM), they would use the service, but on non-working days, the service is barely used during that time; rather, it is used in the afternoon.

   iii. Plot C: It seems that when the weather has worse conditions, the less people use the service. This may be because these people choose to stay home, or work/school is cancelled for those specific whether conditions.