Remember transfer the y into 0 and 1 first

Q1

Consider the space shuttle data ?shuttle in the MASS library. Consider modeling the use of the autolander as the outcome (variable name use). Fit a logistic regression model with autolander (variable auto) use (labeled as “auto” 1) versus not (0) as predicted by wind sign (variable wind). Give the estimated odds ratio for autolander use comparing head winds, labeled as “head” in the variable headwind (numerator) to tail winds (denominator).

```
library(MASS)
?shuttle
shuttle$use.binary <- as.integer(shuttle$use == "auto")
fit <- glm(use.binary ~ wind - 1, data = shuttle, family = binomial)
summary(fit)$coef
```

```
##              Estimate Std. Error  z value  Pr(>|z|)
## windhead 0.2513144  0.1781742 1.410499 0.1583925
## windtail 0.2831263  0.1785510 1.585689 0.1128099
```

```
unname(exp(coef(fit))[1]/exp(coef(fit))[2]) #Estimated Odds ratio
```

```
## [1] 0.9686888
```

```
#Which mean windhead is 0.9687 times than the windtail to be auto , so windtail is mo
re likely to be auto.
```

Q2

Consider the previous problem. Give the estimated odds ratio for autolander use comparing head winds (numerator) to tail winds (denominator) adjusting for wind strength from the variable magn.

```
library(MASS)
shuttle$use.binary <- as.integer(shuttle$use == "auto")
fit <- glm(use.binary ~ wind+magn - 1, data = shuttle, family = binomial)
summary(fit)$coef
```

```
##                  Estimate Std. Error       z value  Pr(>|z|)
## windhead    3.635093e-01  0.2840608  1.279688e+00 0.2006547
## windtail    3.955180e-01  0.2843987  1.390717e+00 0.1643114
## magnMedium -1.009525e-15  0.3599481 -2.804642e-15 1.0000000
## magnOut    -3.795136e-01  0.3567709 -1.063746e+00 0.2874438
```