1. **Odds:** If $p$ is the probability of an event, the odds in favor of the event is $\frac{p}{1-p}$.

2. The fitted model gives us a model for the log of the odds of an event. (The link value is the log of the odds.)

3. The difference of two fitted values is the difference of log odds. The difference of logs is the log of the quotient!

4. **Odds Ratio:** Comparing two events with probabilities $p_1$ and $p_2$, the odds ratio is

\[ \frac{p_1/(1-p_1)}{p_2/(1-p_2)} \]

```r
data(MedGPA)
gl <- glm(Acceptance ~ GPA + MCAT, data = MedGPA, family = binomial)
coefficients(gl)
```

(Intercept) GPA MCAT
-22.3727 4.6765 0.1645

5. Interpreting the coefficient of **MCAT:**

For each unit difference in MCAT score we would estimate a difference in log odds of 0.165. This is a log of odds ratio of 0.165. This is an odds ratio of $e^{0.165}$.

```r
exp(coefficients(gl))
```

(Intercept) GPA MCAT
1.922e-10 1.074e+02 1.179e+00

6. Low birth weight (**low** is 1) and smoking (**smoke** is 1) in 189 women.

```r
> tally(~low + smoke, data = birthwt)

smoke
low 0 1
 0 86 44
 1 29 30

> g <- glm(low ~ smoke, data = birthwt, family = "binomial")
> exp(coefficients(g))

(Intercept) smoke
0.3372 2.0219

> (30/44)/(29/86)

[1] 2.022

> exp(confint(g))

*Waiting for profiling to be done...*

2.5 % 97.5 %
(Intercept) 0.2178 0.507
smoke 1.0819 3.801

*Chapel: Singing, Nate Glasper, Jr. with Student Worship Team*