P8131 HW2

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Problem 1

Fit the model with logit, probit, and complementary log-log links

```
## # A tibble: 5 x 4
##   dose_x num_of_dying total_num  live
##    <int>        <dbl>     <dbl> <dbl>
## 1      0            2        30    28
## 2      1            8        30    22
## 3      2           15        30    15
## 4      3           23        30     7
## 5      4           27        30     3
```

Fit $g(P(dying)) = \alpha + \beta X$ using logit:

```
# Fit GLM
fit.logit = glm(cbind(num_of_dying, live) ~ dose_x, family = binomial(link = 'logit'),
          data = data1)
fit.logit$coefficients
```

```
## (Intercept)      dose_x
##   -2.323790    1.161895
```

```
fit.logit$deviance
```

```
## [1] 0.3787483
```

So the fitted logit model is

$$\hat{\pi}(x) = \frac{e^{-2.323790+1.161895x}}{1+e^{-2.323790+1.161895x}}$$

β is 1.161895.

Fit $g(P(dying)) = \alpha + \beta X$ using probit:

```
fit.probit = glm(cbind(num_of_dying, live) ~ dose_x, family = binomial(link = 'probit'),
          data = data1)
fit.probit$coefficients
```

```
## (Intercept)      dose_x
##  -1.3770923   0.6863805
```

```
fit.probit$deviance
```

```
## [1] 0.3136684
```

Fit $g(P(dying)) = \alpha + \beta X$ using complementary log-log:

```r
fit.cloglog = glm(cbind(num_of_dying, live) ~ dose_x, family = binomial(link = 'cloglog'),
          data = data1)
fit.cloglog$coefficients
```

```
## (Intercept)      dose_x
##  -1.9941520   0.7468193
```

```r
fit.cloglog$deviance
```

```
## [1] 2.230479
```

Calculate CI's

Therefore, the table is: