1. The maximum likelihood estimator is asymptotically unbiased.

   True

   False

2. For a finite sample size n, $\hat{\theta}_{ML} \sim N\left(\theta, I^{-1}(\theta)\right)$.

   True

   False

3. Let β_j be the parameter associated with predictor x_j in a binomial regression model. For a reasonably large sample size n, a standard normal "z-test" can be used to test $H_0: \beta_j = 0 \;\; vs. \;\; H_1: \beta \neq 0,$

   True

   False

4. Let $X_1, ..., X_n$ be a random sample from a distribution with pdf $f(x;\theta)$, and let $\hat{\theta}$ be the maximum likelihood estimator of θ. Then

   $$\left(\hat{\theta}_{ML} - \frac{1.96}{\sqrt{nI(\theta)}}, \hat{\theta}_{ML} + \frac{1.96}{\sqrt{nI(\theta)}}\right)$$

   is an approximate 95% confidence interval for θ.

   True

   False

5. Goodness of fit metrics - such as the residual deviance - are not useful for the binomial regression with a Bernoulli (0/1) response.

   True

   False

6. Cconsider a logistic regression fit an independent response $Y_i \sim Binomial(1, p)$ and a single predictor variable x. The linear predictor is:

   $\eta_i = \beta_0 + \beta_1 x_i.$

   Test $H_0: \beta_1 = 0 \;\; vs \;\; H_1: \beta_1 \neq 0$ by computing the appropriate p-value, rounded to the hundredths place.

```
Coefficients:
            Estimate Std. Error
(Intercept)  -1.2467     0.6347
x             1.4224     1.1541
---
```

   0.11

   0.05

   1

   0.22

7. Cconsider a logistic regression fit an independent response $Y_i \sim Binomial(1, p)$ and a single predictor variable x. The linear predictor is:

   $\eta_i = \beta_0 + \beta_1 x_i.$

   Use maximum likelihood theory to construct an approximate 95% confidence interval for β_0. Round all values to the hundredths place.

```
Coefficients:
            Estimate Std. Error
(Intercept)  -1.2467     0.6347
x             1.4224     1.1541
---
```

   (-2.28, -0.22)

   (-0.47, 3.31)

   (-2.48, -0.02)