Name:

Quiz 9 – 4/26/2023

Problem	Weight	Score
1a	1	
1b	1	
Total		/ 20

Instructions. You have 15 minutes to complete this quiz. You may use your plebe-issue TI-36X Pro calculator. You may <u>not</u> use any other materials.

<u>Show all your work.</u> To receive full credit, your solutions must be completely correct, sufficiently justified, and easy to follow.

Problem 1. The *Encyclopedia Titanica* contains a dataset of the passengers on the *Titanic*, the luxury oceanliner that sank famously in the North Atlantic Ocean on its maiden voyage in April 1912.

You are interested in the relationship between survival and the passenger's age. You fit a logistic regression model, with *Survived* (1 if the passenger survived, 0 otherwise) as the response variable, and *Age* (in years) as the explanatory variable. Here is the R output:

```
Call:
glm(formula = Survived ~ Age, family = binomial, data = Titanic)

Deviance Residuals:
    Min      1Q   Median      3Q      Max
 -1.1418  -1.0489  -0.9792   1.3039   1.4801

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -0.081428   0.173862  -0.468   0.6395
Age         -0.008795   0.005232  -1.681   0.0928 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 1025.6  on 755  degrees of freedom
Residual deviance: 1022.7  on 754  degrees of freedom
  (557 observations deleted due to missingness)
AIC: 1026.7

Number of Fisher Scoring iterations: 4
```

a. Give a 95% confidence interval on the odds ratio corresponding to a unit increase in *Age*.

Note that $z_{0.05} = 1.64$, $z_{0.025} = 1.96$, and $z_{0.005} = 2.58$.

b. Is there a statistically significant relationship between *Survived* and *Age*? Perform an appropriate hypothesis test to answer this question. State all four steps of the test, including an answer to the question above. Use a significance level of 0.05.