Assignment 1

Milan Kuzmanovic, Mark McMahon
Martin Kotuliak, Jakub Polak

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Task 1

The following table contains the estimates of a logistic regression model.

	Est.	s.e.	z	p-value	OR	95% C.I. for OR lower	95% C.I. for OR higher
X_1	-0.868	**0.367**	-2.365	0.018	**0.42**	0.205	0.865
X_2	2.404	0.601	4.000	<0.001	**11.067**	**3.408**	**35.943**
X_3	**-3.604**	**0.511**	**-7.059**	<0.001	**0.027**	0.010	0.074

Fill in the missing information (Please report formulas and computation.)

$$\text{s.e.}_{X_1} = \frac{X_1}{z_{X_1}} = \frac{-0.868}{-2.365} = 0.367$$

$$\text{OR}_{X_1} = e^{X_1} = e^{-0.868} = 0.42$$

$$\text{OR}_{X_2} = e^{X_2} = e^{2.404} = 11.067$$

$$\text{lower}_{X_2} = e^{X_2 - z_{0.975} \times \text{s.e.}_{X_2}} = e^{2.404 - 1.96 \times 0.601} = 3.408$$

$$\text{lower}_{X_2} = e^{X_2 + z_{0.975} \times \text{s.e.}_{X_2}} = e^{2.404 + 1.96 \times 0.601} = 35.943$$

$$X_3 = \frac{\ln \text{lower}_{X_3} + \ln \text{higher}_{X_3}}{2} = \frac{0.01 + \ln 0.074}{2} = -3.604$$

$$\text{s.e.}_{X_3} = \frac{-\ln \text{lower}_{X_3} + \ln \text{higher}_{X_3}}{2 \times z_{0.975}} = \frac{-0.01 + \ln 0.074}{2 \times 1.96} = 0.511$$

$$z_{X_3} = \frac{X_3}{\text{s.e.}_{X_3}} = \frac{-3.604}{0.511} = -7.059$$

$$\text{OR}_{X_3} = e^{X_3} = e^{-3.604} = 0.027$$