Poisson regression

- At this point, we are ready to perform our Poisson regression model analysis using the `glm()` function.
- We fit the model and save it in the object `model1` and get a summary of the model.

Poisson Regression with R

```
model1 <- glm(num_awards ~ prog + math,
family="poisson", data=poisreg)

summary(model1)
```

Poisson Regression with R

```
Call:
glm(formula = num_awards ~ prog + math,
      family = "poisson",
      data = poisreg)

Deviance Residuals:
Min       1Q   Median       3Q      Max
-2.204  -0.844  -0.511    0.256    2.680
```

Poisson Regression with R

```
Coefficients:
                Estimate Std. Error z value Pr(>|z|)
(Intercept)      -5.2471     0.6585   -7.97  1.6e-15 ***
progAcademic      1.0839     0.3583    3.03   0.0025 **
progVocational    0.3698     0.4411    0.84   0.4018
math              0.0702     0.0106    6.62  3.6e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '
```

Poisson Regression with R

```
(Dispersion parameter for poisson family taken to be 1)

Null deviance: 287.67  on 199  degrees of freedom
Residual deviance: 189.45  on 196  degrees of freedom
AIC: 373.5

Number of Fisher Scoring iterations: 6
```

Poisson Regression with R

Regression Coefficients

- Intercept $\beta_0 = -5.2471$
- progAcademic $\beta_1 = 1.0839$
- progVocational $\beta_2 = 0.3698$
- math $\beta_3 = 0.0702$

Exercise

Predict number of awards for Vocational Student with a maths mark of 70.

$$\hat{Y} = e^{-5.2471} \times e^{1.0839 \times 0} \times e^{0.3698 \times 1} \times e^{0.0702 \times 70} = e^{0.0367} = 1.0373$$

MA4128 Review

(i) Based on R output, be able to carry out calculations similar to that in previous slide.