Previously on MA40189:

- **aim:** inferences about parameter $\theta$ given data $x$
- **classical setting:** $\theta$ is a fixed unknown constant; work with $f(x \mid \theta)$ (a function of the data $x$ for given $\theta$)
- **Bayesian approach:** $\theta$ is treated as random; specify a prior distribution $f(\theta)$ (a function of the parameter $\theta$)

Today on MA40189:

- look more closely at the Bayesian approach and its use of Bayes’ theorem:

\[
f(\theta \mid x) = \frac{f(x \mid \theta)f(\theta)}{f(x)} \propto f(x \mid \theta)f(\theta)
\]

- updating rule is thus:

\[
\text{Posterior} \propto \text{Prior} \times \text{Likelihood}
\]

- look at using Bayes’ theorem for general random variables $X$ and $Y$