$$p(Y_{new}|X_{obs}, Y_{obs}) = \int_{\theta} p(Y_{new}|\theta, X_{obs})p(\theta|Y_{obs})d\theta$$

where:

- $p(Y_{new}|X_{obs}, Y_{obs})$ is the posterior predictive distribution for a new observation or set of observations with predictors, X_{obs}
- $p(Y_{new}|\theta, X_{obs})$ gives the predictive distribution conditional on a set of parameters θ
- $p(\theta|Y_{obs})$ is the posterior distribution of our parameters (and captures our uncertainty about them after collecting data, Y_{obs})