suppose we have binomial function $P(m|N,p)$,

└ m head in N trials with the chance of head, p

and we pick a prior which is beta distribution $\beta(p|a,b)$,

with bayesian equation :

$$P(p|m) = \frac{\overbrace{P(m|N,p)}^{\text{binomial}} \cdot \overbrace{\beta(p|a,b)}^{\text{beta}}}{\int_0^1 P(m|N,p)\cdot P(p|a,b)\,dp} = \frac{\binom{n}{m} p^{m}(1-p)^{N-m} \cdot p^{a-1}(1-p)^{b-1}\frac{1}{\beta(a,b)}}{\boxed{\int_0^1 \binom{n}{m} p^{m}(1-p)^{N-m} \cdot p^{a-1}(1-p)^{b-1}\frac{1}{\beta(a,b)}\,dp}}$$

$\int$ (joint pdf) dp
it's the normalization factor

$$= \frac{\cancel{\binom{n}{m}}\, p^{m+a-1}(1-p)^{N-m+b-1}\frac{1}{\cancel{\beta(a,b)}}}{\int_0^1 \cancel{\binom{n}{m}}\, p^{m+a-1}(1-p)^{N-m+b-1}\frac{1}{\cancel{\beta(a,b)}}\,dp} = \frac{p^{m+a-1}(1-p)^{N-m+b-1}}{\beta(m+a,\, N-m+b)} = \beta(p|m+a, N-m+b) \quad \#$$