

# Intro to Probability Theory

$$P(a)$$

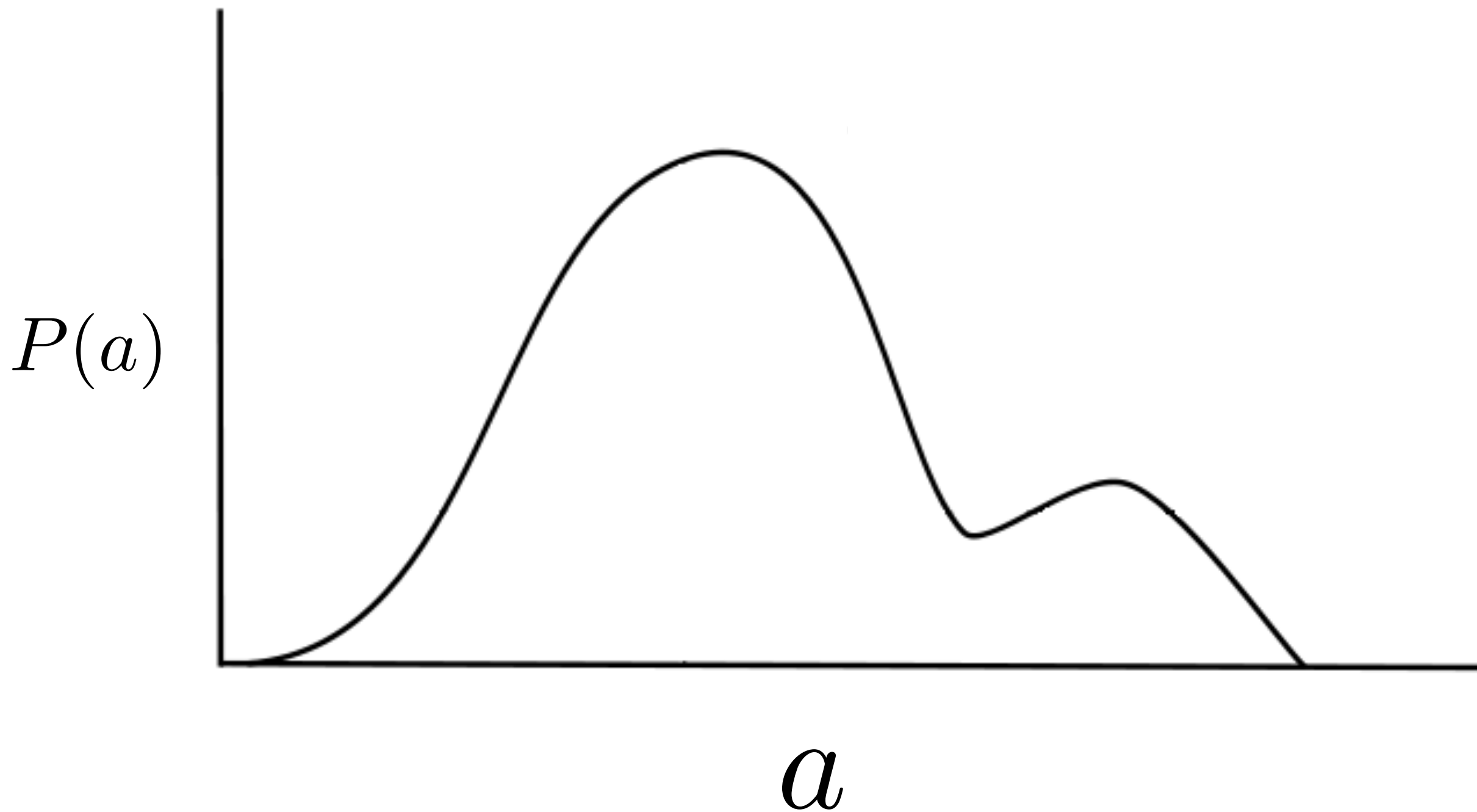
# Intro to Probability Theory

$$P(a = \textit{heads})$$

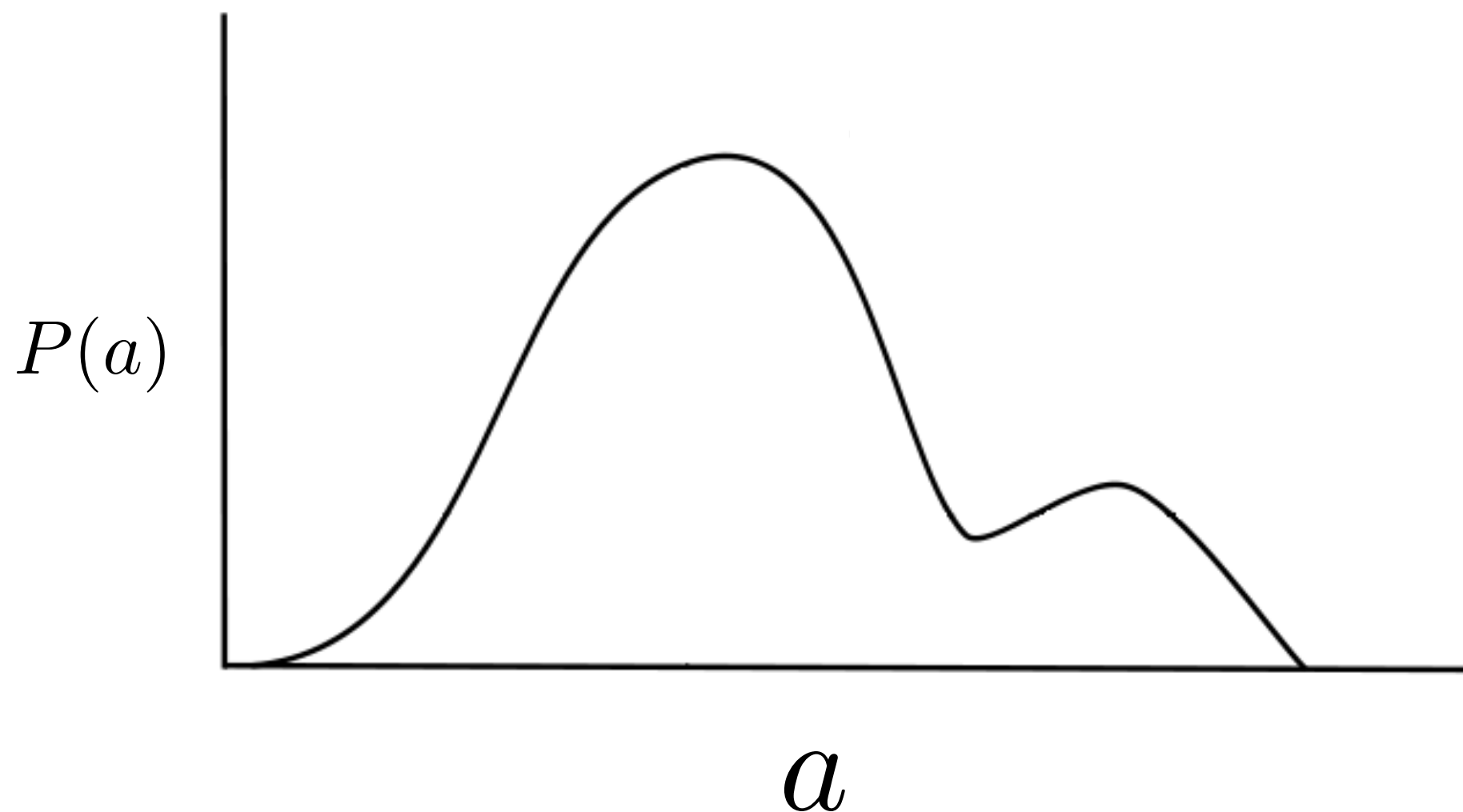
# Intro to Probability Theory

$$P(a = \textit{heads}) = 0.5$$

# Intro to Probability Theory

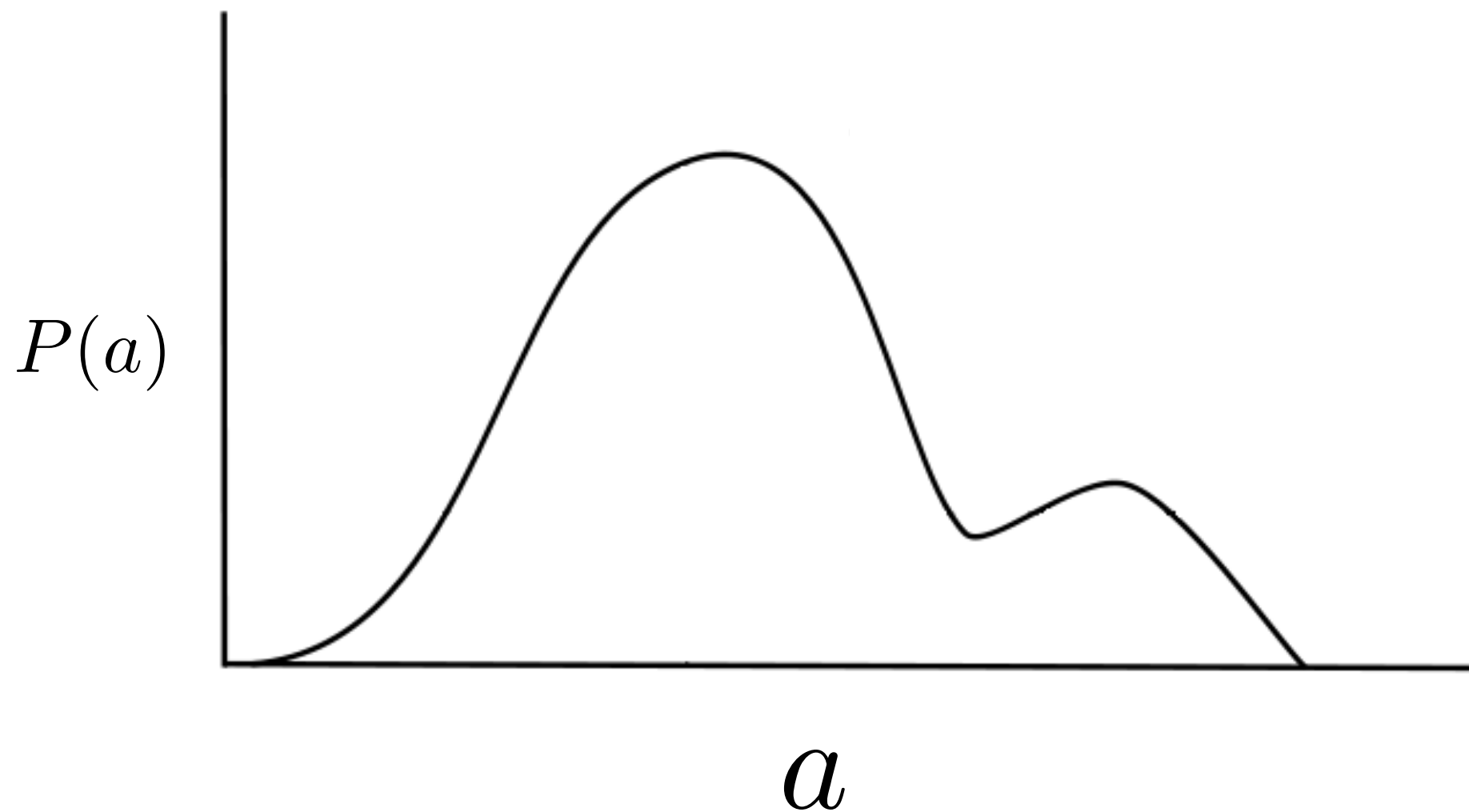


# Intro to Probability Theory



$$P(a) \geq 0, \text{ for all } a$$

# Intro to Probability Theory



$$\int P(a) da = 1$$

# Intro to Probability Theory

$$P(a = \textit{heads}) = 0.5$$

$$P(a = \textit{tails}) = 0.5$$

# Intro to Probability Theory

$$\int P(a) da = 1$$

$P(a)$  has units of  $1/a$



# Intro to Probability Theory

$$P(a|b)$$

# Intro to Probability Theory

$$\int P(a|b) da = 1$$

# Intro to Probability Theory

$$P(a) =$$

“Marginalization”

# Intro to Probability Theory

$$\int P(a|b)db = 1$$

# Intro to Probability Theory


$$\int P(a|b) db = 1$$

has units of  $b/a$

# Intro to Probability Theory

$$P(a, b) = P(a)P(a|b)$$

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$$P(a, b) = P(a)P(a|b)$$

$$P(b, a) = P(b)P(b|a)$$

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$$P(a, b) = P(a)P(a|b)$$

$$P(b, a) = P(b)P(b|a)$$

$$P(b, a) = P(a, b)$$



# Intro to Probability Theory

$$P(a, b) = P(a)P(a|b)$$

$$P(b, a) = P(b)P(b|a)$$

$$P(b, a) = P(a, b)$$

$$P(a|b) = \frac{P(b|a)P(a)}{P(b)}$$

Bayes's  
Theorem