Question

A national park has created a dataset to help hikers determine if a reptile they encounter could be venomous.

	Head	Eyes	Size	Venomous
1	Triangle	Elliptical	Small	Yes
2	Round	Round	Small	No
3	Narrow	Elliptical	Small	No
4	Narrow	Round	Large	No
5	Narrow	Elliptical	Large	Yes
6	Triangle	Round	Small	Yes
7	Narrow	Round	Large	No
8	Round	Elliptical	Large	No
9	Triangle	Elliptical	Small	Yes

Use Naïve Bayes to predict if the following example is venomous or not:
Head=narrow, Eyes=elliptical, Size=Large
Show the working for your calculations.

E1 is head=narrow, E2 is eyes=elliptical, E3 is size=Large

P(yes) = 4/9   P(no)=5/9

P(E1|yes) = ¼   P(E1|no) = 3/5

P(E2|yes) = ¾   P(E2|no) = 2/5

P(E3|yes)=1/4   P(E3|no)=3/5

$P(yes|E) = \dfrac{\frac{1}{4}*\frac{3}{4}*\frac{1}{4}*\frac{4}{9}}{P(E)}= 0.021 / P(E)$

$P(no|E)= \dfrac{\frac{3}{5}*\frac{2}{5}*\frac{3}{5}*\frac{5}{9}}{P(E)} = 0.08 / P(E)$

⇨ The prediction will be that the example is not venomous