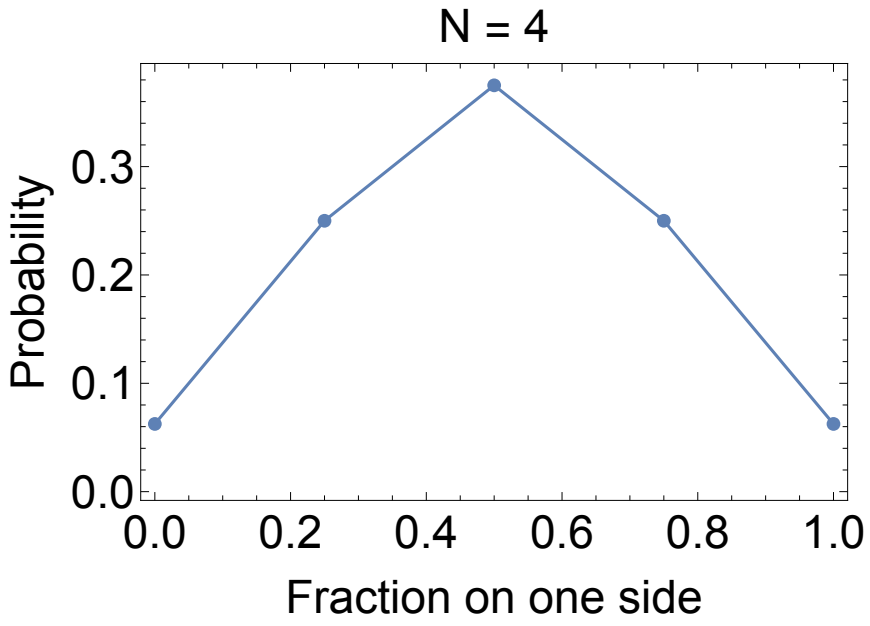
For an ideal gas with ‘n’ particles, plot the probability of finding a fraction ‘f’ on one side of the box. (That is, imagine dividing the box in half at an instant, and count the fraction of particles on the left hand side.)

In[84]:=
```
probtab[n_] := Module[{tab, total},
  tab = Table[N[{nl / n, n! / ((nl!) (n - nl)!)}], {nl, 0, n}];
  total = Total[tab[[All, 2]]];
  tab = Table[{tab[[nl, 1]], tab[[nl, 2]] / total}, {nl, 1, n + 1}]
 ]
```

In[100]:=
```
probplot[n_] :=
 ListLinePlot[probtab[n], Mesh → If[n < 1000, All, None], PlotRange → All,
  ImageSize → Scaled[0.7], LabelStyle → Large, Frame → True, FrameLabel →
   {{"Probability", None}, {"Fraction on one side", StringForm["N = ``", n]}}]
```

In[101]:=
```
probplot[4]
```

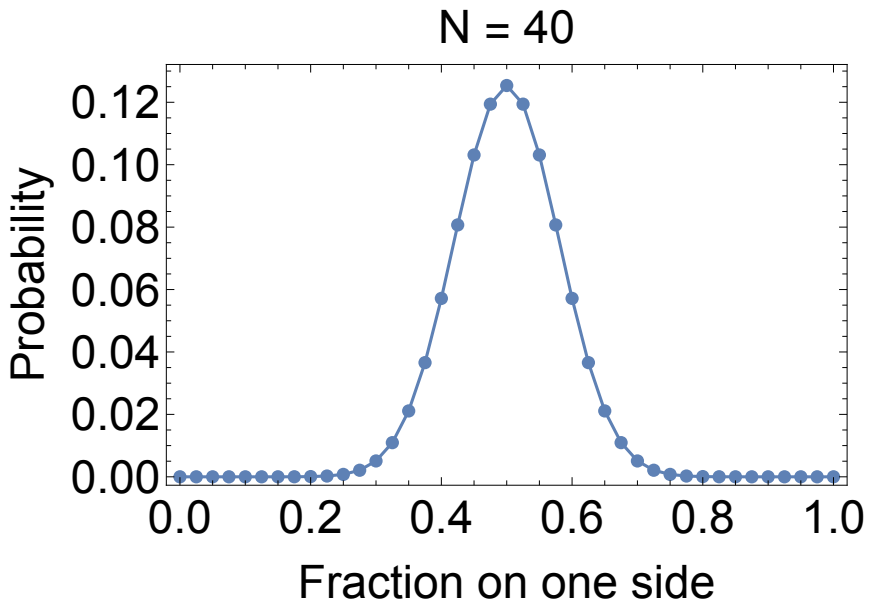
Out[101]=



In[102]:=

```
probplot[40]
```

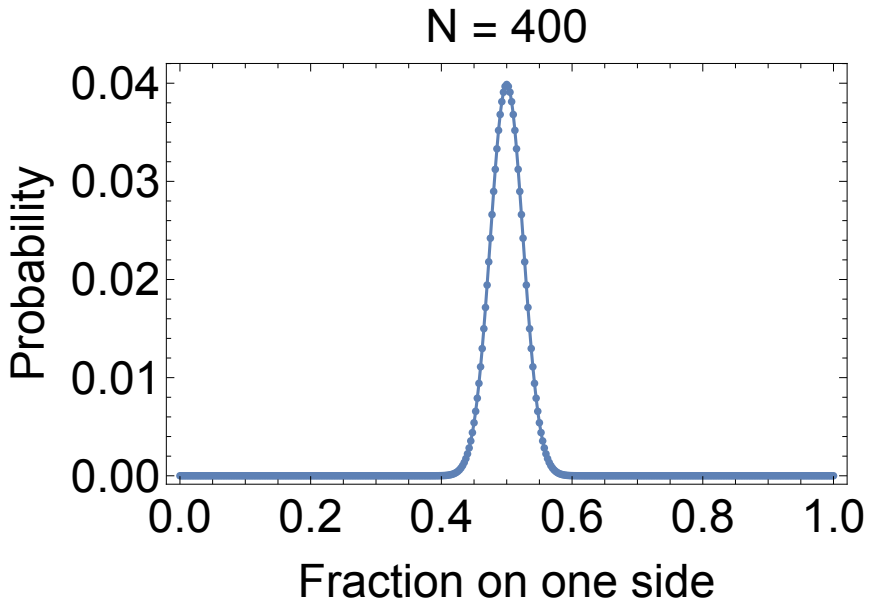
Out[102]=



In[103]:=

```
probplot[400]
```

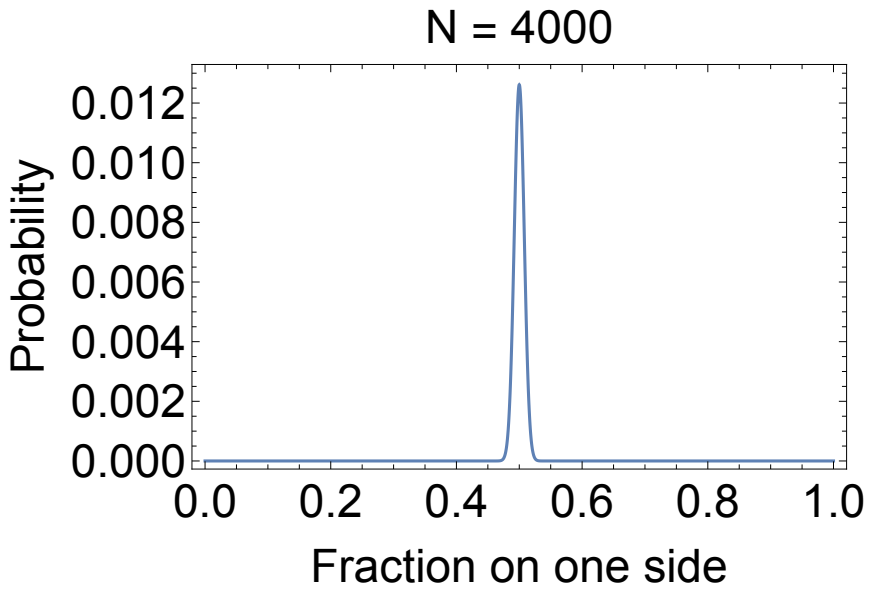
Out[103]=



In[104]:=

```
probplot[4000] // Quiet
```

Out[104]=



In[105]:=

```
probplot[40 000] // Quiet
```

Out[105]=