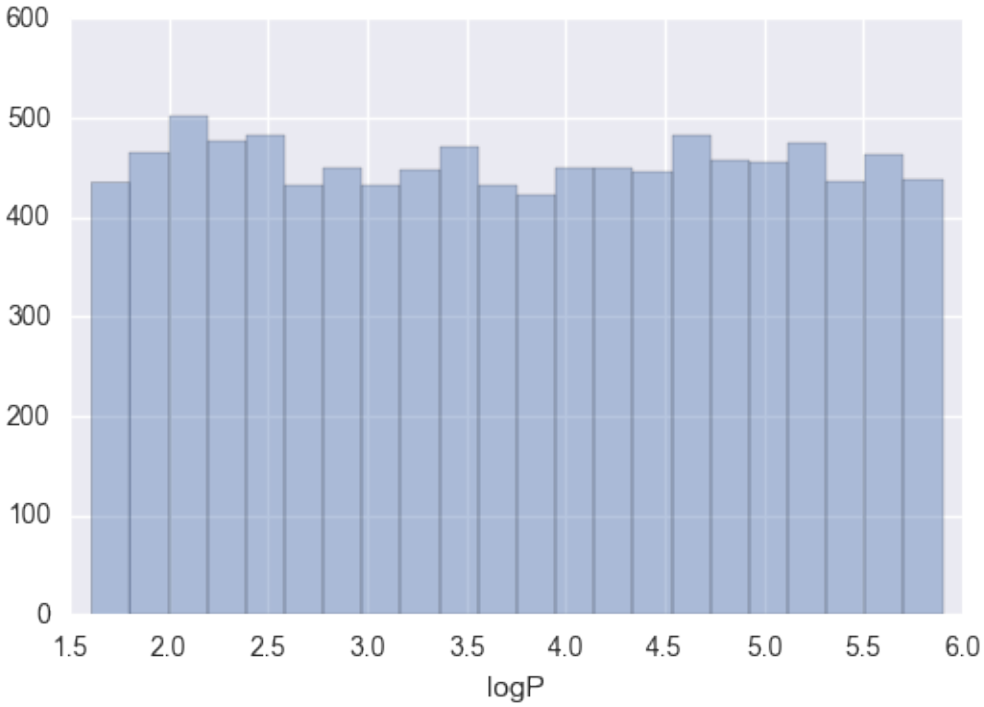
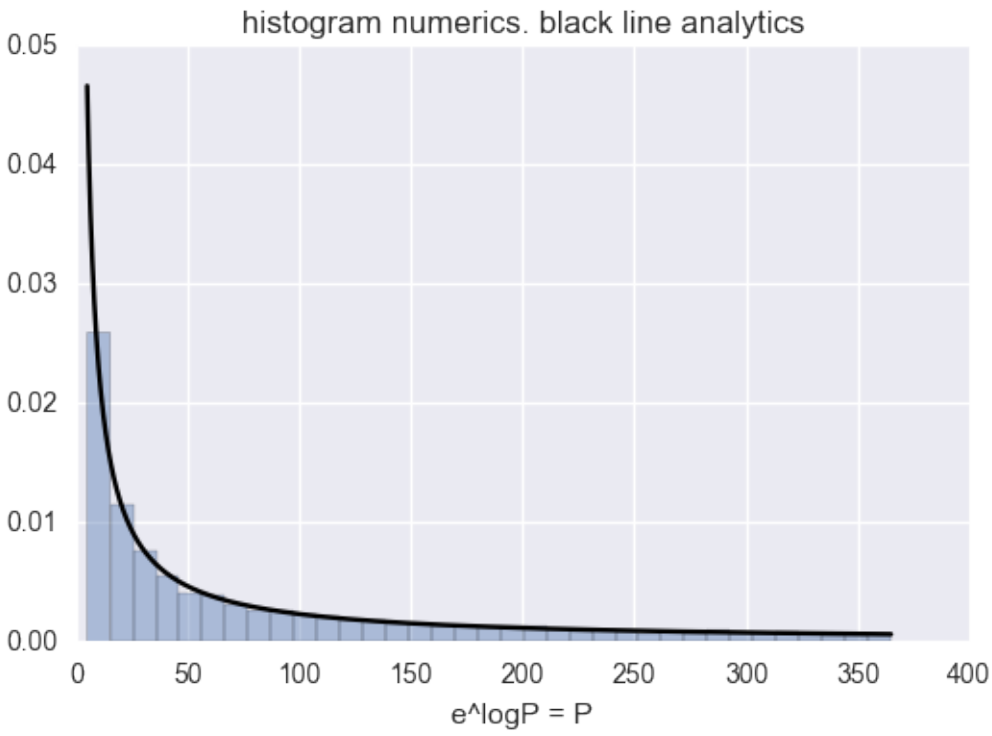
drawing_transit_params

March 9, 2017

```
In [1]: import numpy as np

In [2]: np.random.uniform(low=0.0, high=1.0)

Out[2]: 0.6305771054861267

In [3]: q1,q2 = np.random.uniform(low=0.0, high=1.0),np.random.uniform(low=0.0, hig

In [4]: q1

Out[4]: 0.10960605336936868

In [5]: q2

Out[5]: 0.8821653168301476

In [6]: np.rad2deg(-np.pi)

Out[6]: -180.0

In [7]: foo = np.random.uniform(low=np.log(5), high=np.log(365), size=1e4)

/home/luke/Dropbox/miniconda3/envs/sci/lib/python3.5/site-packages/ipykernel/__main
  if __name__ == '__main__':


In [8]: import matplotlib.pyplot as plt
        import seaborn as sns
        %matplotlib inline

        ax = sns.distplot(foo, kde=False)
        ax.set(xlabel='logP');
```

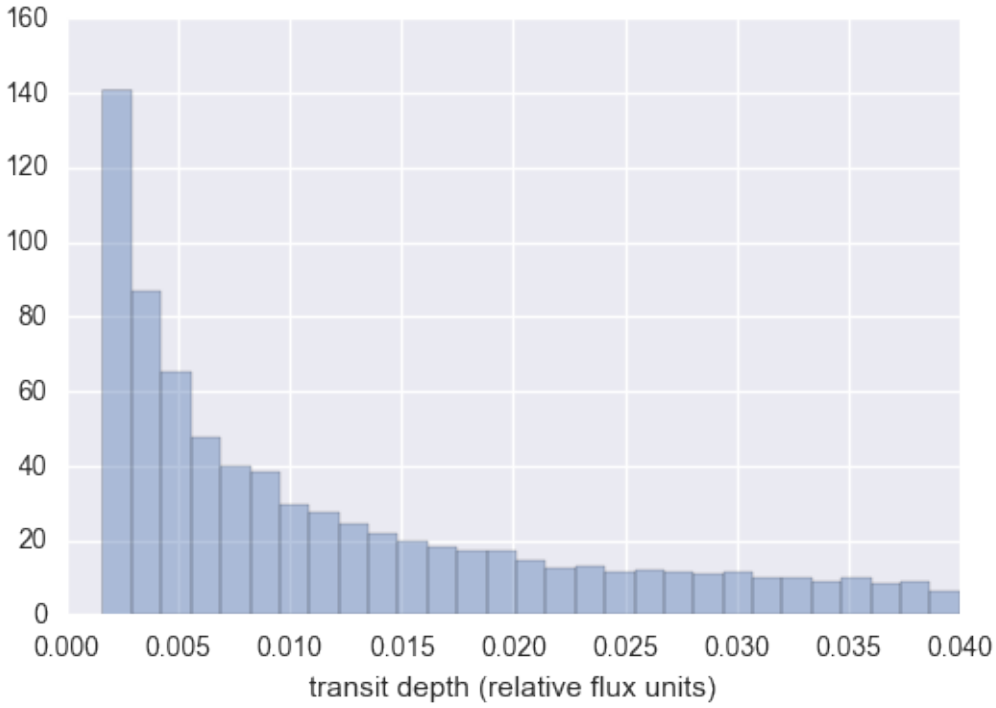



```
In [9]: ax = sns.distplot(np.e**foo, kde=False, norm_hist=True)
        ax.set(xlabel='e^logP = P')
        P1, P2 = 5, 365
        P = np.arange(5,365,0.1)
        ax.plot(P, 1/(np.log(P2) - np.log(P1))/P, 'k-')
        ax.set(title='histogram numerics. black line analytics');
```

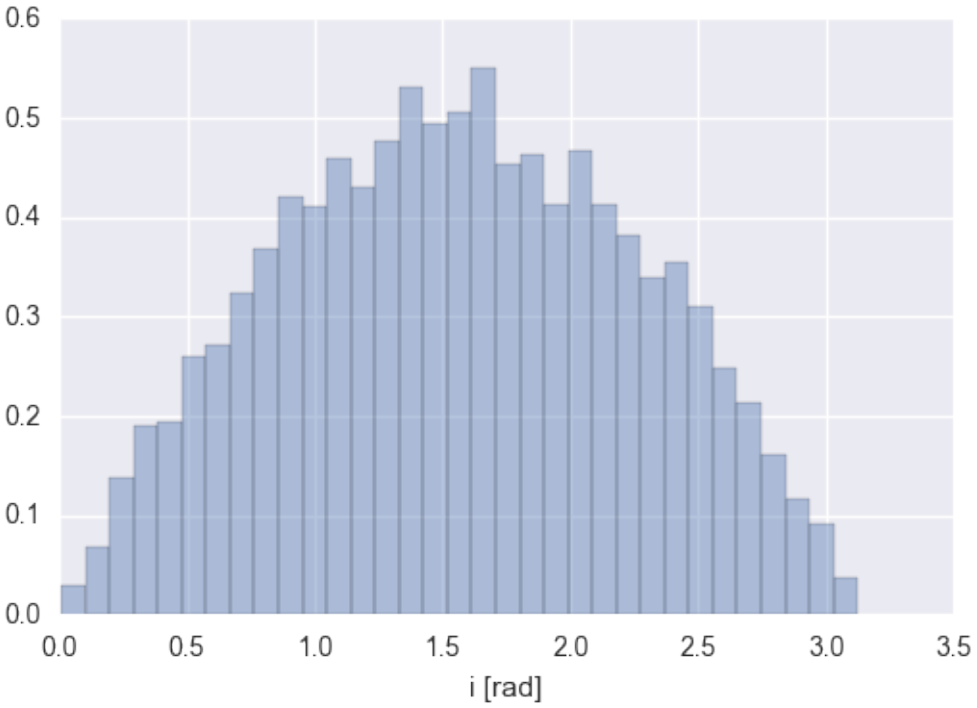



```
In [10]: ln_Rp = np.random.uniform(low=np.log(0.04), high=np.log(0.2), size=1e4)
         Rp = np.e**ln_Rp
         δ = Rp**2
         ax = sns.distplot(δ, kde=False, norm_hist=True)
         ax.set(xlabel='transit depth (relative flux units)');
```

```
/home/luke/Dropbox/miniconda3/envs/sci/lib/python3.5/site-packages/ipykernel/__mair
  if __name__ == '__main__':
```




```
In [11]: 0.04**2

Out[11]: 0.0016

In [12]: cosi = np.random.uniform(-1,1,size=1e4)
         ax = sns.distplot(np.arccos(cosi), kde=False, norm_hist=True)
         ax.set(xlabel='i [rad]');

/home/luke/Dropbox/miniconda3/envs/sci/lib/python3.5/site-packages/ipykernel/__mair
  if __name__ == '__main__':
```



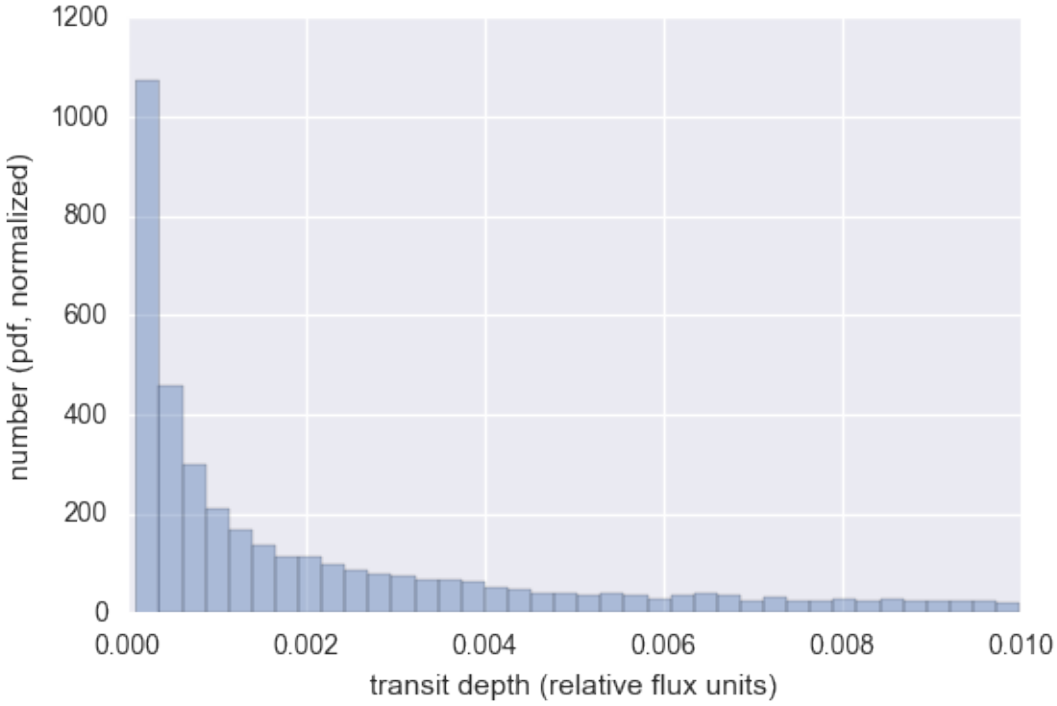

```
In [13]: import astropy.units as u
         import astropy.constants as c

In [14]: totmass = 2*u.Msun
         P = 1*u.year
         a = (P**2 * c.G*totmass/(4*np.pi**2))**(1/3.)
         print(a.to(u.au))
         print(2**(1/3.))

1.2600219816626004 AU
1.2599210498948732


In [15]: c.G

Out[15]:
```

$6.67384 \times 10^{-11}\ \frac{\mathrm{m}^3}{\mathrm{kg\,s}^2}$

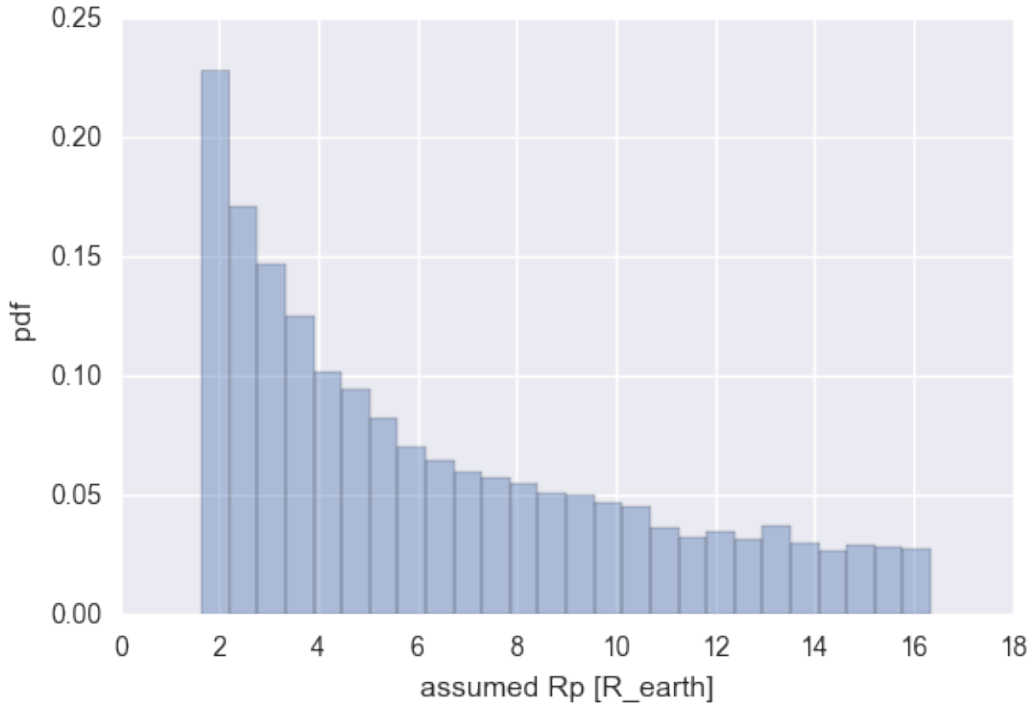
So slightly off because G is not known to good precision >_<

```
In [18]: ln_RpbyRs = np.random.uniform(low=np.log(0.01), high=np.log(0.1), size=1e4
         RpbyRs = np.e**ln_RpbyRs
         δ = RpbyRs**2
         ax = sns.distplot(δ, kde=False, norm_hist=True)
         ax.set(xlabel='transit depth (relative flux units)',
                ylabel='number (pdf, normalized)');
```

```
/home/luke/Dropbox/miniconda3/envs/sci/lib/python3.5/site-packages/ipykernel/__main
  if __name__ == '__main__':
```

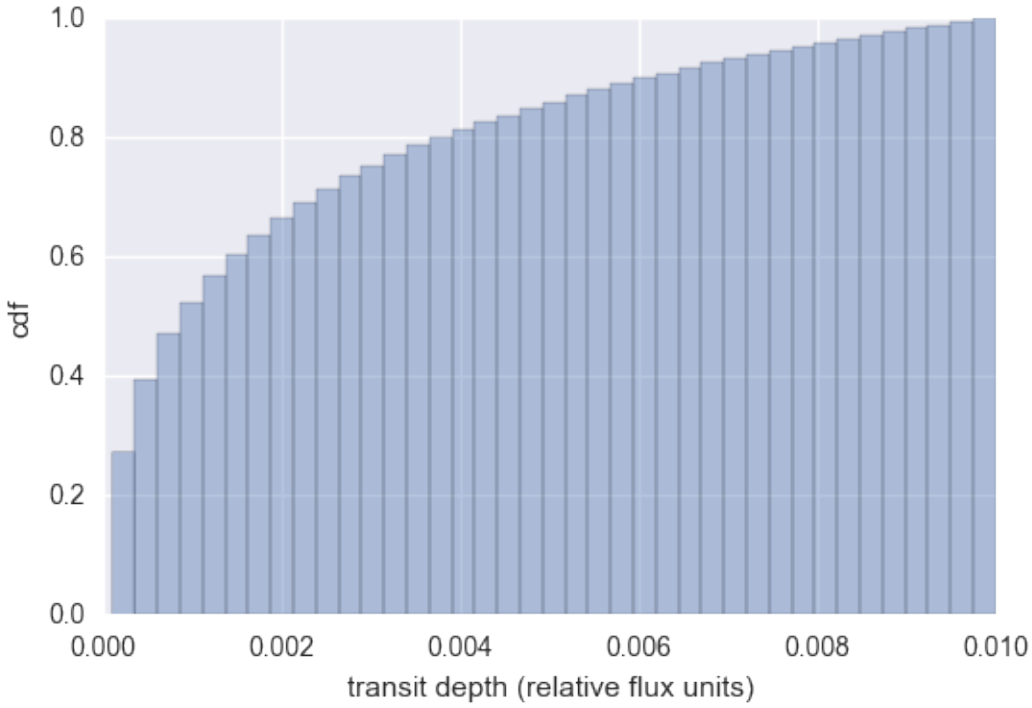


In [19]:
```
ax = sns.distplot((δ**(1/2.)*(1.5*u.R_sun)).to(u.Rearth), kde=False, norm_
ax.set(xlabel='assumed Rp [R_earth]', ylabel='pdf');
```




```
In [26]: ln_RpbyRs = np.random.uniform(low=np.log(0.01), high=np.log(0.1), size=1e4
         RpbyRs = np.e**ln_RpbyRs
         δ = RpbyRs**2
         ax = sns.distplot(δ, kde=False, norm_hist=True,
                           hist_kws=dict(cumulative=True),
                           kde_kws=dict(cumulative=True))
         ax.set(xlabel='transit depth (relative flux units)',
                ylabel='cdf');
```

```
/home/luke/Dropbox/miniconda3/envs/sci/lib/python3.5/site-packages/ipykernel/__main
  if __name__ == '__main__':
```


1.0
0.8
0.6
0.4
0.2
0.0
cdf
0.000
0.002
0.004
0.006
0.008
0.010
transit depth (relative flux units)