hw 19

1. a) $1 - 1/4 = 75\%$

   b) $1 - 1/2^{10} = 99.9\%$

   c) $1 - 1/2^{n}$

2. if order dependent, there are $n \cdot (n-1) \cdot \ldots \cdot (n-k+1)$ possibilities
   if order unimportant, divide by possibilities that are just arrangements, or $k!$:

$$\frac{n(n-1)\cdots(n-k+1)}{k!} = \frac{n!}{k!(n-k)!}$$

3. there are $\binom{n}{k}$ possible ways to choose k heads, order independent
   The odds of a coin landing on k heads (order dependent) is p^k
   The odds of a coin landing on $n-k$ tails is $(1-p)^{n-k}$
   So multiplying these odds by the total number of possibilities removes order dependency.

4. $$\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-x/2}$$

$$= \frac{1}{\sqrt{2\pi}} (\sqrt{2\pi}) = 1$$