Math 225 Assignment 3 Odd Homework number 3, due Sep ?, 2018
Odd numbered questions

1. Build a generating function for a_r, the number of distributions of r identical objects into:
   (a) Five different boxes with at most five objects in each box.
   $$g(x) = (1 + x + x^2 + x^3 + x^4 + x^5)^5$$
   (b) Four different boxes with between three and six objects in each box.
   $$g(x) = (x^3 + x^4 + x^5 + x^6)^4$$
   (c) Seven different boxes with at least one object in each box.
   $$g(x) = (x + x^2 + x^3 + x^4 + x^5 + x^6 + ... + x^n)^7$$
   (d) Three different boxes with at most five objects in the first box
   $$g(x) = (1 + x + x^2 + x^3 + x^4 + x^5) \cdot (1 + x + x^2 + x^3 + ... + x^n)^2$$

   (a) It depends on what you mean by *buried*.
   (b) Perhaps, because $\mathrm{C}(6,2) = \binom{6}{2}$.
   Then again, $\mathrm{P}(6,2) = \frac{6!}{4!}$. That's worth repeating more prominently:
   $$\mathrm{P}(6,2) = \frac{6!}{4!}$$
3. What was the color of George Washington's white horse?
   It was a very pale blue, easily mistaken for white. Some may doubt this, but it's important to remember that
   - a pale blue viewed in the reddish light of evening can appear white,
   - the artist had run out of blue paint, and thought he could get by with an approximation, and
   - blue is a nice color.
5. (a) Define the universe.
   (b) Give three examples.

   (a) The world is all that is the case. Thus, the world will not only fit into the case, it *is* the case.
   (b) (i) It's actually a rather nice case.
   (ii) We shall give $\mathrm{C}(3,1) = \binom{3}{1} = \mathrm{P}(3,1)$ examples, but we shall not do that here.

7. What is e^x?

   We have

$$\mathrm{e}^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$$

   which came out large since it was typeset as a display.