Week in Review #4

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1. (a) $C(4,2) * C(7,4) = 210$

   (b) exactly two red and 4 other balls.
   $C(4,2) * C(15,4) = 8190$

   (c) at least means two or more green balls.
   $C(7,2)*C(12,4)+C(7,3)*C(12,3)+C(7,4)*C(12,2)+C(7,5)*C(12,1)+C(7,6)*C(12,0) = 20664$
   or work this by Total - don't want
   $C(19,6) - [C(7,0) * C(12,6) + C(7,1) * C(12,5)] = 20664$

   (d) the key word is or. Use the formula: $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
   $C(4,2) * C(15,4) + C(8,4) * C(11,2) - C(4,2) * C(8,4) = 11620$

   (e) the key word is or. Use the formula: $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
   $C(4,2) * C(15,4) + C(7,3) * C(12,3) - C(4,2) * C(7,3) * C(8,1) = 14210$

2. For this problem somebody may have both vegetable dishes be the same or both vegetable dishes be different. This means we have to break the problem into two parts.

   part I: both vegetable dishes different.

   $C(10,1) * C(13,2) * C(8,1)$ or $10 * C(13,2) * 8$

   Part II: both vegetable dishes the same.

   $C(10 * 1) * C(13,1) * C(8,1)$ or $10 * 13 * 8$

   Answer: $C(10,1) * C(13,2) * C(8,1) + C(10 * 1) * C(13,1) * C(8,1) = 6240 + 1020 = 7260$

3. $C(20,5) * C(15,5) * C(10,5) * C(5,5)$

4. (a) $\frac{14!}{2!3!2!2!} = 1816214400$

   (b) $\frac{10!}{2!2!2!} = 453600$

5. $P(9,2) * C(7,3)$
   or
   $C(9,1) * C(8,1) * C(7,3)$

6. $C(8,3) * C(10,5) * 8!$

   or

   $8 * 7 * 6 * 10 * 9 * 8 * 7 * 6 * \frac{8!}{3!5!}$

7. (a) $13 * C(4,3) * 12 * C(4,2)$

   (b) $C(13,2) * C(4,2) * C(4,2) * C(44,1)$

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8. (a) $\dfrac{8 * 7 * 13}{15 * 14 * 13}$

   (b) $\dfrac{8 * 7 * 3}{15 * 14 * 13}$

9. $\dfrac{C(8,3)C(22,7)}{C(30,10)}$

10. $\dfrac{6*1*4*1*2*1}{6*5*4*3*2*1} = \dfrac{1}{15} = 0.0667$

11. $\dfrac{C(7,2)*C(8,8) + C(7,3)*C(8,7) + C(7,4)*C(8,6)}{C(15,10)} = \dfrac{69}{143} = 0.426573$

12. (a) $\dfrac{C(10,6)}{C(26,6)} = 0.00091231$

    (b) remember that a majority mean more than half. i.e. at least 4 freshmen.
    $$\dfrac{C(9,4)*C(17,2) + C(9,5)*C(17,1) + C(9,6)*C(17,0)}{C(26,6)} = 0.0840985$$

    (c) $\dfrac{C(4,4)*C(22,2)}{C(26,6)} = \dfrac{3}{2990} = 0.0010033445$

    (d) $\dfrac{C(4,2)*C(22,4)}{C(26,6)} = \dfrac{57}{299} = 0.1906354515$

13. $\dfrac{1}{\frac{11!}{4!4!2!}} = 0.00002886$

14. $\dfrac{3(1*1*14)}{15^3} + \dfrac{1}{15^3}$