Day 6

1. $3! = 6$

2. Choosing 1 out 5

   $^5C_1 = 5$

3. $5! = 6$

4. $^4C_2 = \dfrac{4!}{(4-2)!\,2!} = \dfrac{4!}{2!\,2!} = \dfrac{\cancel{4} \times 3 \times \cancel{2}!}{\cancel{2} \times 1 \times \cancel{2}!}$

   $= 6$

5. $P(H) = \dfrac{1}{2}$

6. $P(4) = \dfrac{1}{6}$

7. $\underline{\square}\,\underline{\square}$ = $3 \times 2 = 6$

   $3w \quad 2w$

8. total $= 7$

   apple $= 3$

   $P(\text{apple}) = \dfrac{3}{7}$

9. $4 \times 3 \times 2 \times 1 = 24$

10. total $= 5$

    green $= 2$ $P(\text{green}) = \dfrac{2}{5}$

11. $^4P_3 = 4 \times 3 \times 2 = 24$.

12. $^7C_3 = \dfrac{7!}{(7-3)!\,3!} = \dfrac{7 \times 6 \times 5 \times \cancel{4!}}{\cancel{4!}\; 3 \times 2 \times 1}$

$= 35$ ways.

13. total $= 52$

king $= 4$

$P(king) = \dfrac{4}{52} = \dfrac{1}{13}$

14. $5! = 120$

15. total $= 10$

black $= 4$

$p(black) = \dfrac{4}{10} = \dfrac{2}{5}$

16. total $= 4$

$^4P_3 = 4 \times 3 \times 2 = 24$

17. even on die $= 2, 4, 6$

$P = \dfrac{3}{6} = \dfrac{1}{2}$

18. $^4C_2 = \dfrac{4!}{2!\,2!} = 2 \times 3 = 6$

19. total = 52

heart = 13

$$P(heart) = \frac{13}{52} = \frac{1}{4}$$

20. $(n-1)! = (4-1)!$

$= 3!$

$= 6$

21. $\frac{\quad \times 4}{2 \quad 3 \quad 4 \quad 2way}$

$= 2 \times 3 \times 4 \times 2 = 48 \text{ numbers}$

22. total → 12

$$^{12}C_2 = \frac{12!}{10!\,2!} = \frac{\overset{6}{12} \times 11 \times 10!}{2 \times 1 \times 10!} = 66$$

$$^{5}C_2 = \frac{5!}{3!\,2!} = \frac{5 \times 4}{2 \times 1} = 10$$

$$P(\text{of Green}) = \frac{10}{66} = \frac{5}{33}$$

23. $5! = 120$

2 should not together

$4! = 24$

$4! \times 2 = 24 \times 2 = 48$

$$120 - 48 = 72 \text{ ways}$$

24. Case 1: 2W, 2M

$$^8C_2 \times {}^{10}C_2 = \frac{8 \times 7 \times 6!}{6! \times 2!} \times \frac{10!}{8! \times 2!}$$

$$= 28 \times 45$$

$$= 1260$$

Case 2: 3W, 1M

$$^8C_3 \times {}^{10}C_1 = \frac{8 \times 7 \times 6 \times 5!}{5! \cdot 3!} \times 10$$

$$= 56 \times 10 = 560$$

Case 3: 4W

$$^8C_4 = \frac{8 \times 7 \times 6 \times 5 \times 4!}{4! \cdot 4 \times 3!}$$

$$= 70$$

$$1260 + 560 + 70 = 1890_{\#}$$

25. Sum of 7 → (1,6), (2,5), (3,4), (4,3)
$$\qquad\qquad\qquad (5,2), (6,1)$$
$$\Rightarrow 6$$
Sum of 7 = 6
total = 36

$$P(7) = \frac{6}{36} = \frac{1}{6}_{\#}$$