

# Unit 1 Test Review

\*OMIT #9, 10 & 11  
We did not cover these problems

Probability & Combinatorics

1. Outcomes: HTT, THT, TTH, HTH, HHH, HHT, THH, TTT

Only 1 H:  $\frac{3}{8}$

2.  $p = \frac{13C5}{52C5} = \frac{1287}{2598960}$

3. a.  $\frac{4}{11} \cdot \frac{2}{11} = \frac{8}{121}$

b.  $\frac{5}{11} \cdot \frac{0}{10} = 0$  (No white in the jar)

c.  $\frac{5}{11} \cdot \frac{4}{10} = \frac{2}{11}$

4. a.  $\frac{1}{7P7} = \frac{1}{5040}$

b.  $\left(\frac{1}{5040}\right)^3 = 7.811 \times 10^{-12}$

5. Total outcomes =  $52 \cdot 6 \cdot 2 = 624$

a.  $\frac{1}{52} \cdot \frac{1}{6} \cdot \frac{1}{2} = \frac{1}{624}$

b.  $\frac{12}{52} \cdot \frac{3}{6} \cdot \frac{1}{2} = \frac{3}{52}$

6. Lets say class of 25  $\rightarrow$  15 boys  $\rightarrow$  10 blonds  $\rightarrow$  3 boy + blond

$$\frac{15}{25} + \frac{10}{25} - \frac{3}{25} = \frac{22}{25}$$

7.  $\left(\frac{1}{2}\right)^9 = \frac{1}{512}$

8.  $AXYZ = 4$   
 $ABCD = 16$

$$\frac{4}{16} = \frac{1}{4}$$

$$\begin{aligned} \times r=4 & \quad {}_5C_4 \cdot (0.8)^4 \cdot (0.2)^1 = 0.4096 \\ r=5 & \quad {}_5C_5 \cdot (0.8)^5 \cdot (0.2)^0 = 0.32768 \\ & \quad 0.4096 + 0.32768 = \boxed{0.737} \end{aligned}$$

$$\begin{aligned} \times a. r=8 & \quad {}_{10}C_8 (.3)^8 (.7)^2 = 0.001 \\ r=9 & \quad {}_{10}C_9 (.3)^9 (.7)^1 = 0.0001 \\ r=10 & \quad {}_{10}C_{10} (.3)^{10} (.7)^0 = 0.000006 \\ \text{Sum} & = 0.001 + 0.0001 + 0.000006 = \boxed{0.0011} \\ b. r=7 & \quad {}_{10}C_7 (.3)^7 (.7)^3 = \\ & \quad = \boxed{0.009} \end{aligned}$$

$$\begin{aligned} \times a. r=0 & \quad {}_8C_0 \left(\frac{3}{6}\right)^0 \left(\frac{4}{6}\right)^8 = 0.039 \\ r=1 & \quad {}_8C_1 \left(\frac{3}{6}\right)^1 \left(\frac{4}{6}\right)^7 = 0.156 \\ r=2 & \quad {}_8C_2 \left(\frac{3}{6}\right)^2 \left(\frac{4}{6}\right)^6 = 0.273 \\ & \quad 0.039 + 0.156 + 0.273 = \boxed{0.468} \\ b. r=3 & \quad {}_8C_3 \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^5 = \\ & \quad = \boxed{0.219} \end{aligned}$$

c. Consider the complement

$$\begin{aligned} r=7 & \quad {}_8C_7 \left(\frac{1}{6}\right)^7 \left(\frac{5}{6}\right)^1 = 0.00002 \\ r=8 & \quad {}_8C_8 \left(\frac{1}{6}\right)^8 \left(\frac{5}{6}\right)^0 = 0.0000006 \\ \text{Sum} & = 0.00002 + 0.0000006 \\ & \quad = \boxed{2.06 \times 10^{-5}} \end{aligned}$$

$$\begin{aligned} 12. 9 \times 9 & = 81 \quad 3 \times 3 = 9 \\ & \quad \frac{81 - 9}{81} = \frac{72}{81} = \frac{8}{9} \end{aligned}$$

$$13. a. \frac{16\pi}{576} = \frac{\pi}{36} = \boxed{0.087}$$

$$b. \frac{20\pi}{576} = \frac{5\pi}{144} = \boxed{0.109}$$

$$c. \frac{28\pi}{576} = \frac{7\pi}{144} = \boxed{0.153}$$

$$14. \text{ less than } 800 \quad \frac{3}{2,4,5} \frac{4}{\text{all}} \frac{4}{\text{all}} = 48$$

$$\text{even} \quad \frac{4}{\text{all}} \frac{4}{\text{all}} \frac{3}{2,4,8} = 48$$

$$15. 6 \times 4 \times 12 = 288 \quad 6 \times 4 \times 12 \times 3 = 864$$

$$16. 8P_1 \cdot 10P_1 \cdot 7P_1 \cdot 15P_1 \cdot 6C_2 \cdot 14C_4 \\ = 201,801,600$$

$$17. 5C_3 = 10$$

$$18. 9C_2 \cdot 7C_3 = 1260$$

$$19. 4^5 = 1024$$

$$20. \frac{1}{1024}$$

$$21. \frac{5}{9} + \frac{3}{9} - \frac{2}{9} = \frac{6}{9} = \frac{2}{3}$$

$$22. \frac{4}{9} \cdot \frac{4}{9} = \frac{16}{81}$$

$$23. \frac{5}{9} + \frac{1}{9} = \frac{6}{9} = \frac{2}{3}$$

$$24. \frac{5}{9} \cdot \frac{4}{8} = \frac{5}{18}$$