

12. out of 20 pick 4

$$20 nCr 4 = 4845$$

13. out of 10 pick 3

$$10 nCr 3 = 120$$

14. $10 nCr 4 \cdot 10 nCr 3$

$$= 46200$$

DAVID
AVIDD

15. MISSISSIPPI

$$\begin{aligned} * \frac{11!}{\underbrace{1!}_{\# \text{ of M's}} \underbrace{4!}_{\# \text{ of I's}} \underbrace{4!}_{\# \text{ of S's}} \underbrace{2!}_{\# \text{ of P's}}} &= \frac{\cancel{1} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot 5 \cdot 6 \cdots 11}{\cancel{1} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot 1 \cdot 2 \cdot 3 \cdot 4 \cdot 1 \cdot 2} \\ &= \frac{5 \cdot \overset{2}{\cancel{6}} \cdot 7 \cdot \overset{2}{\cancel{8}} \cdot 9 \cdot \overset{5}{\cancel{10}} \cdot 11}{\underset{2}{\cancel{2}} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{4}} \cdot \underset{1}{\cancel{2}}} \\ &= \frac{5 \cdot \cancel{2} \cdot 7 \cdot 2 \cdot 9 \cdot 5 \cdot 11}{\cancel{2}} \\ &= 5 \cdot 7 \cdot 2 \cdot 9 \cdot 5 \cdot 11 \\ &= 34650 \end{aligned}$$

$$\frac{1}{10^9}$$

