Answer on Question#39805 – Math - Other

There are $\binom{48}{13}$ hands with no ace, because we've got to choose 13 cards from 48 ($52 - 4$ aces $= 48$). So there must be $\binom{52}{13} - \binom{48}{13}$ hands with at least one. Thus the proportion that contain at least one ace is

$$P = \frac{\binom{52}{13} - \binom{48}{13}}{\binom{52}{13}} = 1 - \frac{\binom{48}{13}}{\binom{52}{13}} = 1 - \frac{\frac{48!}{35! \cdot 13!}}{\frac{52!}{39! \cdot 13!}} = 1 - \frac{48 \cdot 47 \cdot \ldots \cdot 36}{52 \cdot 51 \cdot \ldots \cdot 40} = 1 - \frac{39 \cdot 38 \cdot 37 \cdot 36}{52 \cdot 51 \cdot 50 \cdot 49} \approx 0.7$$

Answer: 0.7.