16. P(Sunday,brown trousers and black tie) $= \frac{1}{7} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{63}$

P(Sunday,grey trousers and black tie) $= \frac{1}{7} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{63}$

P(Sunday,jeans and black tie) $= \frac{1}{7} \times \frac{1}{3} \times \frac{1}{4} = \frac{1}{84}$

So P(Sunday and black tie) $= \frac{2}{63} + \frac{1}{84} = \frac{8+3}{12 \times 21} = \frac{11}{252}$

similarly, P(weekday and black tie) $= \frac{6}{7}\left(\frac{1}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{2} \times \frac{1}{4}\right) = \frac{6}{7} \times \left(\frac{2}{9} + \frac{1}{24}\right) = \frac{6}{7} \times \frac{19}{72}$

So P(I am wearing a black tie) $= \frac{11}{252} + \frac{6}{7} \times \frac{19}{72} = \frac{11}{252} + \frac{57}{252} = \frac{68}{252}$

so P(It is Sunday given that I am wearing a black tie) $= \frac{11}{252} \times \frac{252}{68} = \frac{11}{68}$

With the new information we stillhave P(Sunday and black tie) $= \frac{11}{252}$

But now we must treat Monday separately so P(Black Tie) is given by

$\frac{11}{252} + \frac{5}{7} \times \frac{19}{72} + \frac{1}{7} \times \frac{1}{2} \times \frac{1}{4} = \frac{11}{252} + \frac{95}{504} + \frac{1}{56} = \frac{22+95+9}{504} = \frac{126}{504}$

So Probablity that it is Sunday is now $\frac{11}{252} \times \frac{504}{126} = \frac{11}{63}$

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