

①

$$(a) \quad \underline{10} \cdot \underline{10} \cdot \underline{10} \cdot \underline{26} \cdot \underline{26} \cdot \underline{3}$$

$$\text{possible licenses} = \boxed{2,028,000}$$

(b)

listing them

abdec  
abedc  
adebc  
adbec  
aedbc  
aebdc

} 6

abstractly counting

$$\underline{a} \quad \underline{3} \cdot \underline{2} \cdot \underline{1} \quad \underline{c}$$

$$3 \cdot 2 \cdot 1 = 6$$

$$\text{answer} = \boxed{6 \text{ permutations}}$$

(2)

$$(a) S = \{ (H, H, H), (H, H, T), (H, T, H), (H, T, T), \\ (T, H, H), (T, H, T), (T, T, H), (T, T, T) \}$$

$$(b) E = \{ (H, T, T), (T, H, T), (T, T, H), (T, T, T) \}$$

$$F = \{ (T, T, H), (T, H, T), (H, T, T) \}$$

$$E \cap F = F$$

$$E \cup F = E$$

$$\bar{F} = \{ (H, H, H), (H, H, T), (H, T, H), (T, H, H), \\ (T, T, T) \}$$

$$(c) P(E) = \frac{4}{8} = \frac{1}{2}$$

$$P(F) = \frac{3}{8}$$

③

(a) See HW 2 - problem # 10

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(b) See HW 2 - Extra problems  
problem # 2

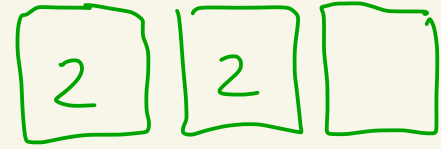

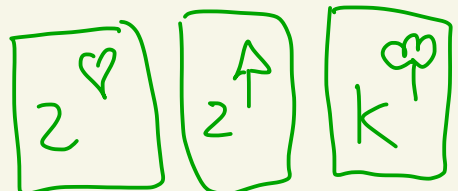
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4

$$(a) \binom{52}{3} = \frac{52!}{3! \cdot 49!} = \frac{52 \cdot 51 \cdot 50 \cdot \cancel{49!}}{6 \cdot \cancel{49!}}$$

$$= \frac{132,600}{6} = 22,100$$

(b)

	<u># ways</u>	<u>Ex:!</u>
<u>Step 1:</u> Pick face value for pair.	$\binom{13}{1} = 13$	
<u>Step 2:</u> Pick two suits for pair	$\binom{4}{2} = 6$	
<u>Step 3:</u> Pick last card. Can't be one of the pair.	$\binom{52-4}{1} = \binom{48}{1} = 48$	

Probability is  $\frac{13 \cdot 6 \cdot 48}{22,100} = \frac{3,744}{22,100} \approx 0.169...$

$\approx 16.9\%$

$$\textcircled{5} \text{(a)} \quad \binom{10}{2} = \frac{10!}{2!8!} = \frac{10 \cdot 9 \cdot \cancel{8!}}{2 \cdot \cancel{8!}} = 5 \cdot 9 = \boxed{45}$$

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(b) # ways to pick one black ball and one orange ball is  $\binom{3}{1} \cdot \binom{4}{1} = 3 \cdot 4 = 12$

probability is  $\frac{12}{45} \approx \boxed{0.26\bar{6}}$   
 $\approx \boxed{26.7\%}$

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(c) # ways to pick two balls both with an odd # on them is

$$\binom{5}{2} = \frac{5!}{2!3!} = \frac{5 \cdot 4 \cdot \cancel{3!}}{2 \cdot \cancel{3!}} = 10$$

probability is  $\frac{10}{45} \approx \boxed{0.22\bar{2}}$   
 $\approx \boxed{22.2\%}$