MAT 17C

# MT3 PRACTICE SOLUTIONS

① (a) $\dfrac{\binom{15}{5}\binom{20}{10}\binom{25}{15}}{\binom{60}{30}}$ (b) $\dfrac{\binom{15}{10}\binom{20}{10}\binom{25}{10}}{\binom{60}{30}}$

(c) $P(15y, 15r) + P(15y, 15g) + P(15r, 15g) = \dfrac{\binom{15}{15}\binom{20}{15}+\binom{15}{15}\binom{25}{15}+\binom{20}{15}\binom{25}{15}}{\binom{60}{30}}$

$$= \frac{\binom{20}{15}+\binom{25}{15}+\binom{20}{15}\binom{25}{15}}{\binom{60}{30}}$$

② (a) $\dfrac{1}{6^{10}}$ (b) $\dfrac{5^{10}}{6^{10}}$ (c) $\dfrac{\binom{10}{3}5^7}{6^{10}}$ (d) $\dfrac{\binom{10}{2}\binom{8}{3}4^5}{6^{10}}$

(e) $\dfrac{P(3\ 6's, \text{no } 5's)}{P(3\ 6's)} = \dfrac{\binom{10}{3}4^7/\cancel{6^{10}}}{\cancel{\binom{10}{3}}5^7/\cancel{6^{10}}} = \left(\dfrac{4}{5}\right)^7$

③ (a) $\dfrac{\binom{20}{7}}{2^{20}}$ (b) $\dfrac{\binom{10}{3}\binom{10}{6}}{2^{20}}$ (or $\dfrac{\binom{10}{3}}{2^{10}} \cdot \dfrac{\binom{10}{6}}{2^{10}}$, by independence.)

④ (a) $\dfrac{15}{60} \cdot \dfrac{20}{59} \cdot \dfrac{14}{58}$ (b) $\dfrac{15}{60} \cdot \dfrac{20}{60} \cdot \dfrac{15}{60} = \dfrac{1}{48}$

⑤ (a) $\dfrac{3!\,8!\,7!\,5!}{20!}$ (b) $\dfrac{7!\,8!\,7!}{20!}$ (c) $\dfrac{13!\,8!}{20!}$

⑥ (a) $\dfrac{4\binom{13}{6}}{\binom{52}{6}}$ (b) $\dfrac{\binom{13}{6} \cdot 4^6}{\binom{52}{6}}$ ← choose values; ← choose suits for each of the 6 values

(c) $\dfrac{\binom{4}{3}\binom{48}{3}}{\binom{52}{6}}$ (d) $1 - P(0 \text{ Aces}) - P(1 \text{ Ace})$

$$= 1 - \frac{\binom{48}{6}}{\binom{52}{6}} - \frac{\binom{4}{1}\binom{48}{5}}{\binom{52}{6}}$$