11. The events are not independent, so P(red second | red first) is not the same as P(red first).

$$P\,(\text{red second and red first}) = P\,(\text{red first}) \cdot P\,(\text{red second}|\text{red first})$$

$$= \frac{3}{10} \cdot \frac{2}{9} \approx 0.067$$

14. 0.6 or 60%

15. 0.52 or 52%

16. 0.53 or 53%

17. 0.45 or 45%

18. They are dependent events.

$P(\text{Game Design}|\text{Sophomore}) \approx 53\%$ and $P(\text{Game Design}) = 50\%$, so $P(\text{Game Design}|\text{Sophomore}) \neq P(\text{Game Design})$. Therefore, they are not independent events.

19. 0.08 or 8%

20. 45%

21. dependent

22. No. Use the conditional probability formula to find the probability that a patient taking a placebo improved.

$$P(\text{Improved}|\text{Placebo}) = \frac{P(\text{Improved and Placebo})}{P(\text{Placebo})}$$

$$= \frac{\frac{47}{200}}{\frac{82}{200}}$$

$$\approx 0.57$$

$P(\text{Improved}|\text{Medication}) \approx 45\%$ while $P(\text{Improved}|\text{Placebo}) \approx 57\%$. Patients taking the medication showed improvement less frequently than patients taking the placebo.

23. 0.225 or 22.5%

28. (C) $\frac{9}{25}$