

19. The order is important in this problem. The number of ways to select 1 and 6 to form 16 is given by permutation ${}_6P_2$, not combination ${}_6C_2$.

$$P(16) = \frac{1}{{}_6P_2} = \frac{1}{30}.$$

22. combination; 330

23. permutation; 3,628,800

24. combination; 126

25. permutation; 40,320

26. permutation; 1,320

27. combination(s); 630

28. a. $\frac{1}{21}$

b. $\frac{5}{42}$

29. a. A permutation should be used because the order in which the beads are chosen matters.

$$P(DEB) = \frac{1}{{}_{10}P_3} = \frac{1}{720}$$

- b. A combination should be used because the order in which the beads are chosen doesn't matter.

$$P(\text{all vowels}) = \frac{{}_3C_3}{{}_{10}C_3} = \frac{1}{120}$$

- 32. a.** In this case order matters, so a permutation must be used. Find the number of permutations of choosing 5 digits.

$$\begin{aligned} {}_{10}P_5 &= \frac{10!}{(10-5)!} \\ &= \frac{10!}{5!} \\ &= 30,240 \end{aligned}$$

There are 30,240 possible ways to choose the digits of a 5-digit number, one of which is the desired number 30429. This gives the following probability.

$$P(30429) = \frac{1}{30,240}$$

- b.** Since there are 5 digits, there are 10^5 possible codes, one of which is 30429. This gives the following probability.

$$P(30429) = \frac{1}{100,000}$$

- 35. (D)** 32,760