

Chapter 10 Test Review

show all work!

Name Key

In 1-3, decide whether the situation is an example of the counting principle, a permutation, or a combination. Then answer the question.

1. Suppose a bakery has 15 pies, 8 cakes, and 7 cookies. How many different ways are there to choose 1 pie, 1 cake, and 1 cookie?

Counting principle: choosing 1 from multiple choices

$$15 \cdot 8 \cdot 7 = \boxed{840} \text{ ways}$$

2. Jimmy John's advertises 2 job openings for sandwich-maker. If 13 qualified students apply, in how many ways can the 2 positions be filled?

Combination: order does not matter

$${}_{13}C_2 = \frac{13!}{11! \cdot 2!} = \frac{13 \cdot 12 \cdot \cancel{11!}}{11! \cdot 2!} = \boxed{78} \text{ ways}$$

3. In how many ways can I arrange 10 cards on my table if I received 16?

permutation: order matters

$${}_{16}P_{10} = \boxed{29,059,430,400}$$

4. If a locker combination consists of 3 different numbers from 0 to 39, what is the probability that you guess the combination correctly on the first try?

$$\frac{1}{40 \cdot 39 \cdot 38} = \boxed{\frac{1}{59,280}} \leftarrow \text{permutation: order matters}$$

5. On Catalpa, 29 of 125 houses have their porch lights on. What is the probability that a house does not have their porch light on?

$$\frac{96}{125} \text{ or } 76.80\%$$

6. What is the sample space when you flip a coin twice? What is the probability of getting 2 heads?

Sample space:
HT, HH, TT, TH

$$\boxed{\frac{1}{4}}$$

7. A card is drawn randomly from a standard 52-card deck. Find the probability of drawing the given card(s).

a. a club $\boxed{\frac{1}{4}}$

b. a 10 of clubs $\boxed{\frac{1}{52}}$

c. a black card $\boxed{\frac{1}{2}}$

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d. a black card or a 10 $\boxed{\frac{7}{13}}$

8. Find the probability of drawing the given cards.

a. a 6 and then a 7,
with replacement

$$\frac{1}{169}$$

b. 3 aces in a row
without replacement

$$\frac{1}{5525}$$

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9. Use Pascal's triangle to expand the binomial.

a. $(3a + 2b)^4$

b. $(-4x^2 + y)^3$

$$81a^4 + 216a^3b + 216a^2b^2 + 96ab^3 + 16b^4$$

$$-64x^6 + 48x^4y - 12xy^2 + y^3$$

10. Find the coefficient of the x^2 term.

$$(5x+3)^3$$

$$\begin{array}{c} 1 \\ 1 \ 1 \\ 1 \ 2 \ 1 \\ 1 \ 3 \ 3 \ 1 \end{array}$$

$$1(5x)^3 + 3(5x)^2(3) + 3(5x)(3^2) + 3^3$$

$$225x^2 \rightarrow \boxed{225}$$

11. Find the indicated probability using all of the given information.

a. $P(A) = 0.3$

$P(B) = 0.6$

$P(A \text{ or } B) = \underline{.8}$

$P(A \text{ and } B) = 0.1$

b. $P(A) = 35\%$

$P(B) = \underline{.65}$ or 65%

$P(A \text{ or } B) = 80\%$

$P(A \text{ and } B) = 20\%$

c. $P(A) = \frac{3}{5}$
 $P(\bar{A}) = \frac{2}{5}$

d. A and B are independent

$P(A) = 0.15$

$P(B) = 0.6$

$P(A \text{ and } B) = \underline{.09}$

e. A and B are dependent

$P(A) = 60\%$

$P(B|A) = \underline{.71}$

$P(A \text{ and } B) = 25\%$

A

B

A and B

12. Of 200 students at a school, 58 play football, 40 play basketball, and 33 play both. What is the probability that a randomly selected student plays either football or basketball but not both?



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$$\boxed{32.5\%}$$

13. When 2 six-sided dice are rolled, what is the probability that the sum is neither 2 nor 12?

$$1 - \frac{2}{36} = \boxed{\frac{17}{18}}$$

14. Calculate the probability of randomly guessing all of the correct answers on a 10-question true-or-false quiz.



$$\left(\frac{1}{2}\right)^{10} = \boxed{\frac{1}{1024}}$$

15. The grades that students received on a recent Algebra exam are given in the table.

Grade	Number of Exams
A	6
B	15
C	7
D	2
E	0

a. A student's exam is randomly chosen. What is the probability that the student received a C or higher?

$$\frac{14}{15}$$

b. A student's exam is randomly chosen. What is the probability that the student did not receive a D?

$$\frac{14}{15}$$

Note: this represents experimental probability