

Practice Test Answer Key

1. Abelardo wants to create several different 7-character screen names. He wants to use arrangements of the first 3 letters of his name (abe), followed by arrangements of the four digits in 2013, the year he will graduate. How many different screen names can he create in this way?

$$3P_3 \cdot 4P_4 = 3! \cdot 4! = 3 \cdot 2 \cdot 1 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

144

2. A train is made up of a locomotive, 7 different cars, and a caboose. If the locomotive must be first, and the caboose must be last, how many different ways can the train be ordered?

$$7! = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 =$$

5040

3. There are 12 candidates in the city election. The winner will be the mayor, and the runner-up will be the vice mayor. How many different combinations of mayor and vice mayor are possible?

$$12P_2 = \frac{12 \cdot 11 \cdot 10!}{10!} =$$

132

- NOTE: Teresa and Julia are among 10 students who have applied for a trip to Washington D.C. Two students from the group will be selected at random for the trip. What is the probability that Teresa and Julia will be the two students selected?

leave answer as a fraction, since calculators will not be used.

$$\frac{2}{10} \cdot \frac{1}{9} = \frac{1}{45}$$

5. A math teacher is randomly distributing 15 rulers with centimeter labels and 10 rulers without centimeter labels. What is the probability that the first ruler she hands out will have centimeter labels and the second one will not have labels?

$$\frac{3}{5} \cdot \frac{10}{25} = \frac{10}{125} = \frac{2}{25}$$

6. On a certain day the chance of rain is 80% in San Francisco and 30% in Sydney. Assume that the chance of rain in the two cities is independent. What is the probability that it will not rain in either city?

$$(.2) \cdot (.7) = .14$$

14%

7. One bag contains 2 green marbles, and 4 white marbles. A second bag contains 3 green marbles and 1 white marble. If Trent randomly draws one marble from each bag, what is the probability that they are both green?

$$\frac{2}{6} \cdot \frac{3}{4} = \frac{1}{4}$$

8. A box contains 7 large red marbles, 5 large yellow marbles, 3 small red marbles, and 5 small yellow marbles. If a marble is drawn at random, what is the probability it is yellow, given that it is one of the large marbles?

20 marbles total

$$\frac{5}{20} = \frac{1}{4}$$

9. How many terms does the binomial expansion of $(x^2 + 2y^3)^{20}$ contain? Explain.

21 terms. The n^{th} row has $n+1$ terms.

10. What are the first four terms in the expansion of $(1+2x)^6$?

$$1 + 12x + 60x^2 + 160x^3$$

11. What is $(x+y)^5$ in expanded form?

$$x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$$

12. $(3y-1)^4 =$

$$81y^4 - 108y^3 + 54y^2 - 12y + 1$$

13. (back) →

40%

$$P(\text{baseball and catcher}) = .42$$

$$P(\text{baseball}) \cdot (.70) = .42$$

$$P(\text{baseball}) = \frac{.42}{.7} = .6$$

$$P(\text{basketball}) = (1 - .7) \cdot .6 = .4$$