Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

1. **In a group of 56, 31 chose art, 26 chose music, and 6 chose both. Find the number in exactly one group, in the union, and in neither group.**

Reference: Use |A union B|=|A|+|B|-|A intersection B|. Subtract the union from the total for neither.

2. **A survey of 42 people recorded sets A, B, and C. Totals are |A|=14, |B|=17, |C|=17, |A intersection B|=4, |A intersection C|=4, |B intersection C|=4, and |A intersection B intersection C|=1. Find the union and neither.**

Reference: For three sets, add singles, subtract pair intersections, then add the triple intersection once.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

3. **4 selections are made independently and uniformly from 15 labels, with replacement. Find the probability that at least two selections match.**

Reference: Compute 1 minus the probability that all selections are distinct.

4. **A code uses one of 8 colors followed by one of 10 digits, with every code equally likely. A prize code uses one of 4 marked colors and one of 8 marked digits. Find the favorable count, total count, and probability.**

Reference: Use the multiplication rule separately for favorable outcomes and for all outcomes.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

5. **6 selections are made independently and uniformly from 19 labels, with replacement. Find the probability that at least two selections match.**

Reference: Compute 1 minus the probability that all selections are distinct.

6. **A survey of 41 people recorded sets A, B, and C. Totals are |A|=14, |B|=16, |C|=15, |A intersection B|=5, |A intersection C|=5, |B intersection C|=5, and |A intersection B intersection C|=2. Find the union and neither.**

Reference: For three sets, add singles, subtract pair intersections, then add the triple intersection once.

State the model or rule, show exact setup, then round only the final decimal.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

7. **A code uses one of 6 colors followed by one of 10 digits, with every code equally likely. A prize code uses one of 2 marked colors and one of 3 marked digits. Find the favorable count, total count, and probability.**

Reference: Use the multiplication rule separately for favorable outcomes and for all outcomes.

8. **In a group of 54, 28 chose art, 28 chose music, and 6 chose both. Find the number in exactly one group, in the union, and in neither group.**

Reference: Use |A union B|=|A|+|B|-|A intersection B|. Subtract the union from the total for neither.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Worked Answer Key

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

1. **In a group of 56, 31 chose art, 26 chose music, and 6 chose both. Find the number in exactly one group, in the union, and in neither group.**

Reference: Use |A union B|=|A|+|B|-|A intersection B|. Subtract the union from the total for neither.

Answer: exactly one 45; union 51; neither 5

1. Art only=31-6=25; music only=26-6=20.
2. Exactly one=25+20=45. Union=31+26-6=51.
3. Neither=56-51=5.

2. **A survey of 42 people recorded sets A, B, and C. Totals are |A|=14, |B|=17, |C|=17, |A intersection B|=4, |A intersection C|=4, |B intersection C|=4, and |A intersection B intersection C|=1. Find the union and neither.**

Reference: For three sets, add singles, subtract pair intersections, then add the triple intersection once.

Answer: union 37; neither 5

1. Union=14+17+17-4-4-4+1=37.
2. Neither=42-37=5.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Worked Answer Key

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

3. **4 selections are made independently and uniformly from 15 labels, with replacement. Find the probability that at least two selections match.**

Reference: Compute 1 minus the probability that all selections are distinct.

Answer: 0.353

1. P(all distinct)=(15 x 14 x 13 x 12)/15^4.
2. P(a collision)=1-P(all distinct)=0.353.

4. **A code uses one of 8 colors followed by one of 10 digits, with every code equally likely. A prize code uses one of 4 marked colors and one of 8 marked digits. Find the favorable count, total count, and probability.**

Reference: Use the multiplication rule separately for favorable outcomes and for all outcomes.

Answer: 32/80 = 0.400

1. Favorable count=4(8)=32.
2. Total count=8(10)=80.
3. Probability=32/80=0.400.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Worked Answer Key

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

5. **6 selections are made independently and uniformly from 19 labels, with replacement. Find the probability that at least two selections match.**

Reference: Compute 1 minus the probability that all selections are distinct.

Answer: 0.585

1. P(all distinct)=(19 x 18 x 17 x 16 x 15 x 14)/19^6.
2. P(a collision)=1-P(all distinct)=0.585.

6. **A survey of 41 people recorded sets A, B, and C. Totals are |A|=14, |B|=16, |C|=15, |A intersection B|=5, |A intersection C|=5, |B intersection C|=5, and |A intersection B intersection C|=2. Find the union and neither.**

Reference: For three sets, add singles, subtract pair intersections, then add the triple intersection once.

Answer: union 32; neither 9

1. Union=14+16+15-5-5-5+2=32.
2. Neither=41-32=9.

Name _____ Score _____ Teacher _____ Date _____

Compound Counting and Probability

Worked Answer Key

Show favorable and total counts before forming a probability. For collisions, use the no-collision complement.

7. **A code uses one of 6 colors followed by one of 10 digits, with every code equally likely. A prize code uses one of 2 marked colors and one of 3 marked digits. Find the favorable count, total count, and probability.**

Reference: Use the multiplication rule separately for favorable outcomes and for all outcomes.

Answer: 6/60 = 0.100

1. Favorable count=2(3)=6.
2. Total count=6(10)=60.
3. Probability=6/60=0.100.

8. **In a group of 54, 28 chose art, 28 chose music, and 6 chose both. Find the number in exactly one group, in the union, and in neither group.**

Reference: Use |A union B|=|A|+|B|-|A intersection B|. Subtract the union from the total for neither.

Answer: exactly one 44; union 50; neither 4

1. Art only=28-6=22; music only=28-6=22.
2. Exactly one=22+22=44. Union=28+28-6=50.
3. Neither=54-50=4.