

## Counting Principle &amp; Mutually Exclusive and Overlapping Probabilities Date \_\_\_\_\_

**Determine if the scenario involves mutually exclusive events.**

- 1) A litter of kittens consists of one gray female, two gray males, two black females, and one black male. You randomly pick one kitten. The kitten is black or male.
- 2) A box of chocolates contains four milk chocolates and six dark chocolates. Two of the milk chocolates and two of the dark chocolates have peanuts inside. You randomly select and eat a chocolate. It is a dark chocolate or has no peanuts inside.

**Find the probability.**

- 3) A litter of kittens consists of two gray females, one gray male, one black female, and three black males. You randomly pick one kitten. The kitten is gray or male.
- 4) You roll a fair six-sided die. The die shows a one or a two.
- 5) A magazine contains twelve pages. You open to a random page. The page number is five or nine.
- 6) A litter of kittens consists of one gray female, three gray males, two black females, and one black male. You randomly pick one kitten. The kitten is black or female.
- 7) A bag contains four red marbles, three blue marbles, and three yellow marbles. You randomly pick a marble. The marble is red or blue.
- 8) A litter of kittens consists of two gray kittens, two black kittens, and three mixed-color kittens. You randomly pick one kitten. The kitten is gray or mixed-color.
- 9) A basket contains seven apples and five peaches. Six of the apples and four of the peaches are rotten. You randomly pick a piece of fruit. It is fresh or it is a peach.
- 10) A litter of kittens consists of three gray females, one gray male, one black female, and three black males. You randomly pick one kitten. The kitten is black or male.
- 11) A bag contains three white jerseys numbered one to three. The bag also contains four red jerseys numbered one to four. You randomly pick a jersey. It is red or has an odd number.
- 12) A cooler contains thirteen bottles of sports drink: four lemon-lime flavored, five orange flavored, and four fruit-punch flavored. You randomly grab a bottle. It is a lemon-lime or an orange.

**Represent the sample space using set notation.**

- 13) A bag contains two red marbles and three blue marbles. You randomly pick a marble.
- 14) A basket contains one apple, one peach, and one orange. You randomly pick a piece of fruit.
- 15) An ice cream stand offers four flavors: strawberry, chocolate, vanilla, and mint chocolate chip.
- 16) When a button is pressed, a computer program outputs a random odd number greater than 1 and less than 11. You press the button once.
- 17) A hot dog stand offers both small and large hot dogs. Each hot dog can be ordered plain or with mustard.
- 18) A new car is available in a sedan model and a hatchback model. It is available in red, white, green, black, and yellow.
- 19) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 8. You press the button twice.
- 20) Two rooms in a house need to be painted. Each room can be painted either white or yellow.

**Find the number of possible outcomes in the sample space.**

- 21) A sandwich shop has three types of sandwiches: ham, turkey, and chicken. Each sandwich can be ordered with white bread or multi-grain bread. Customers can add any combination of the six available toppings
- 22) A softball player bats four times in a game. Each at-bat results in an out, getting on base, or hitting a home run.

- 23) The chess club must decide when and where to meet for a practice. The possible days are Monday, Tuesday, Wednesday, or Thursday. The possible times are 3, 4, or 5 p.m. There are seven classrooms available.
- 24) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 8. You press the button four times.
- 25) A basket contains one apple, one peach, and one orange. You randomly pick a piece of fruit.
- 26) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 10. You press the button once.
- 27) There are two dimes and a nickel in your pocket. You randomly pick a coin.
- 28) A room in a house needs to be painted. The room can be painted either white or yellow.

**Find the probability of each event.**

- 29) A meeting takes place between a diplomat and nine government officials. However, five of the officials are actually spies. If the diplomat gives secret information to four of the attendees at random, what is the probability that no secret information was given to the spies?
- 30) A class has four girls and two boys. If the teacher randomly picks four students, what is the probability that she will pick all girls?
- 31) A bag contains nine real diamonds and five fake diamonds. If nine diamonds are picked from the bag at random, what is the probability that all of them are real?
- 32) Mofor is carrying six pages of math homework and five pages of English homework. A gust of wind blows the pages out of his hands and he is only able to recover six random pages. What is the probability that he recovers all of his math homework?

## Counting Principle &amp; Mutually Exclusive and Overlapping Probabilities Date \_\_\_\_\_

**Determine if the scenario involves mutually exclusive events.**

- 1) A litter of kittens consists of one gray female, two gray males, two black females, and one black male. You randomly pick one kitten. The kitten is black or male.

Not mutually exclusive

- 2) A box of chocolates contains four milk chocolates and six dark chocolates. Two of the milk chocolates and two of the dark chocolates have peanuts inside. You randomly select and eat a chocolate. It is a dark chocolate or has no peanuts inside.

Not mutually exclusive

**Find the probability.**

- 3) A litter of kittens consists of two gray females, one gray male, one black female, and three black males. You randomly pick one kitten. The kitten is gray or male.

$$\frac{6}{7} \approx 0.857$$

- 4) You roll a fair six-sided die. The die shows a one or a two

$$\frac{1}{3} \approx 0.333$$

- 5) A magazine contains twelve pages. You open to a random page. The page number is five or nine.

$$\frac{1}{6} \approx 0.167$$

- 6) A litter of kittens consists of one gray female, three gray males, two black females, and one black male. You randomly pick one kitten. The kitten is black or female.

$$\frac{4}{7} \approx 0.571$$

- 7) A bag contains four red marbles, three blue marbles, and three yellow marbles. You randomly pick a marble. The marble is red or blue.

$$\frac{7}{10} = 0.7$$

- 8) A litter of kittens consists of two gray kittens, two black kittens, and three mixed-color kittens. You randomly pick one kitten. The kitten is gray or mixed-color.

$$\frac{5}{7} \approx 0.714$$

- 9) A basket contains seven apples and five peaches. Six of the apples and four of the peaches are rotten. You randomly pick a piece of fruit. It is fresh or it is a peach.

$$\frac{1}{2} = 0.5$$

- 10) A litter of kittens consists of three gray females, one gray male, one black female, and three black males. You randomly pick one kitten. The kitten is black or male.

$$\frac{5}{8} = 0.625$$

- 11) A bag contains three white jerseys numbered one to three. The bag also contains four red jerseys numbered one to four. You randomly pick a jersey. It is red or has an odd number.

$$\frac{6}{7} \approx 0.857$$

- 12) A cooler contains thirteen bottles of sports drink: four lemon-lime flavored, five orange flavored, and four fruit-punch flavored. You randomly grab a bottle. It is a lemon-lime or an orange.

$$\frac{9}{13} \approx 0.692$$

**Represent the sample space using set notation.**

- 13) A bag contains two red marbles and three blue marbles. You randomly pick a marble.

$\{\text{red}_1, \text{red}_2, \text{blue}_1, \text{blue}_2, \text{blue}_3\}$

- 15) An ice cream stand offers four flavors: strawberry, chocolate, vanilla, and mint chocolate chip.

$\{\text{strawberry, chocolate, vanilla, mint cc}\}$

- 17) A hot dog stand offers both small and large hot dogs. Each hot dog can be ordered plain or with mustard.

$\{(S, P), (S, M), (L, P), (L, M)\}$

- 19) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 8. You press the button twice.

$\{(2, 2), (2, 4), (2, 6), (4, 2), (4, 4), (4, 6), (6, 2), (6, 4), (6, 6)\}$

- 14) A basket contains one apple, one peach, and one orange. You randomly pick a piece of fruit.

$\{\text{apple, peach, orange}\}$

- 16) When a button is pressed, a computer program outputs a random odd number greater than 1 and less than 11. You press the button once.

$\{3, 5, 7, 9\}$

- 18) A new car is available in a sedan model and a hatchback model. It is available in red, white, green, black, and yellow.

$\{(S, R), (S, W), (S, G), (S, B), (S, Y), (H, R), (H, W), (H, G), (H, B), (H, Y)\}$

- 20) Two rooms in a house need to be painted. Each room can be painted either white or yellow.

$\{(W, W), (W, Y), (Y, W), (Y, Y)\}$

**Find the number of possible outcomes in the sample space.**

- 21) A sandwich shop has three types of sandwiches: ham, turkey, and chicken. Each sandwich can be ordered with white bread or multi-grain bread. Customers can add any combination of the six available toppings

384

- 22) A softball player bats four times in a game. Each at-bat results in an out, getting on base, or hitting a home run.

81

23) The chess club must decide when and where to meet for a practice. The possible days are Monday, Tuesday, Wednesday, or Thursday. The possible times are 3, 4, or 5 p.m. There are seven classrooms available.

84

25) A basket contains one apple, one peach, and one orange. You randomly pick a piece of fruit.

3

27) There are two dimes and a nickel in your pocket. You randomly pick a coin.

3

24) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 8. You press the button four times.

81

26) When a button is pressed, a computer program outputs a random even number greater than 0 and less than 10. You press the button once.

4

28) A room in a house needs to be painted. The room can be painted either white or yellow.

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### Find the probability of each event.

29) A meeting takes place between a diplomat and nine government officials. However, five of the officials are actually spies. If the diplomat gives secret information to four of the attendees at random, what is the probability that no secret information was given to the spies?

$$\frac{1}{126} \approx 0.794\%$$

31) A bag contains nine real diamonds and five fake diamonds. If nine diamonds are picked from the bag at random, what is the probability that all of them are real?

$$\frac{1}{2002} \approx 0.05\%$$

30) A class has four girls and two boys. If the teacher randomly picks four students, what is the probability that she will pick all girls?

$$\frac{1}{15} \approx 6.667\%$$

32) Mofor is carrying six pages of math homework and five pages of English homework. A gust of wind blows the pages out of his hands and he is only able to recover six random pages. What is the probability that he recovers all of his math homework?

$$\frac{1}{462} \approx 0.216\%$$