

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) A saleswoman packed 3 jackets and 5 skirts. With one jacket, she could wear all 5 skirts. With another jacket, she could wear 4 skirts. With the third jacket, she could wear only 2 skirts. How many different combinations did she have? 1) _____
- A) 40 B) 22 C) 11 D) 10

Find the number of ways to get the following card combinations from a 52-card deck.

- 2) Three of one kind and two of another kind (such as three aces and two nines) 2) _____
- A) 24 ways B) 3744 ways C) 44,928 ways D) 1872 ways

If two fair dice, one red and one white, are rolled, in how many ways can the result be obtained?

- 3) A different number on each die. 3) _____
- A) 36 ways B) 6 ways C) 30 ways D) 25 ways

Use a tree diagram showing all possible results when four fair coins are tossed. Then list the ways of getting the indicated result.

- 4) exactly two tails 4) _____
- A) hhtt, htht, htth, thth, tthh B) tthh
- C) hhtt, htht, htth, thht, thth, tthh D) hhtt, htht, htth, thht, thth, tthh, ttth

Solve the problem.

- 5) How many different committees can be selected from a group of 10 people if a committee must have between 2 and 4 people (inclusive)? 5) _____
- A) 375 B) 276 C) 326 D) 420

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

- 6) The sum of the numbers showing is either 3 or 4. 6) _____
- A) (1,2),(2,2) B) (1,2),(1,3),(2,2)
- C) (1,2),(2,1),(1,3),(3,1),(2,2) D) (2,1),(3,1),(2,2)

Solve the problem.

- 7) Mark can remember only the first 4 digits of his friend's phone number. He also knows that the number has 7 digits and that the last digit is not a 0. If Mark were to dial all of the possible numbers and if it takes him 23 seconds to try each one, how long would it take to try every possibility? 7) _____
- A) 11.5 minutes B) 38.3 minutes C) 383.4 minutes D) 345 minutes

- 8) A computer printer allows for optional settings with a panel of four on-off switches in a row. How many different settings can be selected if no three adjacent switches can all be off? 8) _____
- A) 13 B) 14 C) 10 D) 12

Read each combination value directly from Pascal's Triangle.

- 9) ${}_{10}C_0$ 9) _____
- A) 1,814,400 B) 1 C) 10 D) 907,200

Solve the problem.

- 10) Of the 2,598,960 different five-card hands possible from a deck of 52 playing cards, how many would contain all black cards. 10) _____
- A) 65,780 hands B) 263,120 hands C) 32,890 hands D) 131,560 hands

If two fair dice, one red and one white, are rolled, in how many ways can the result be obtained?

- 11) The sum of the two dice is less than 5. 11) _____
- A) 5 ways B) 4 ways C) 10 ways D) 6 ways

Solve the problem.

- 12) Given a group of 8 women and 11 men, how many different ways are there of choosing one man and one woman for a committee? 12) _____
- A) 361 B) 88 C) 342 D) 19

- 13) A shirt company has 4 designs, each of which can be made with short or long sleeves. There are 6 color patterns available. How many different types of shirts are available from this company? 13) _____
- A) 48 types B) 10 types C) 24 types D) 12 types

- 14) How many different 4-letter radio-station call letters can be made if the first letter must be K or W, repeats are allowed, but the call letters cannot end in an O? 14) _____
- A) 35,152 B) 456,976 C) 16,900 D) 33,800

- 15) How many 5-card poker hands consisting of 2 aces and 3 kings are possible with an ordinary 52-card deck? 15) _____
- A) 288 B) 12 C) 24 D) 6

Use a tree diagram showing all possible results when four fair coins are tossed. Then list the ways of getting the indicated result.

- 16) more than two tails 16) _____
- A) hhtt, htth, htth, hhtt, thht, thth, thtt, tthh, ttth, tttt
- B) hhtt, thtt, ttth, tttt
- C) hhtt, thtt, ttth, tttt
- D) hhtt, htth, htth, thht, thth, tthh

Solve the problem.

- 17) License plates are made using 2 letters followed by 2 digits. How many plates can be made if repetition of letters and digits is allowed? 17) _____
- A) 10,000 B) 67,600 C) 456,976 D) 6760

Find the number of ways to get the following card combinations from a 52-card deck.

- 18) Two black queens and two red aces 18) _____
- A) 144 ways B) 48 ways C) 1,152 ways D) 192 ways

Evaluate the factorial expression.

- 19) $\frac{7!}{5! 2!}$ 19) _____
- A) 42 B) 7 C) 1 D) 21

Solve the problem.

- 20) If you toss four fair coins, in how many ways can you obtain at least one head? 20) _____
- A) 16 ways B) 5 ways C) 4 ways D) 15 ways
- 21) A group of five entertainers will be selected from a group of twenty entertainers that includes Small and Trout. In how many ways could the group of five include at least one of the entertainers Small and Trout? 21) _____
- A) 8568 ways B) 11628 ways C) 6936 ways D) 15,504 ways

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

- 22) The sum of the numbers showing is either 4 or 5 and one die is a 2. 22) _____
- A) (2,3),(3,2) B) (2,2),(3,2)
C) (2,2),(2,3),(3,2) D) (2,2),(2,3)

Evaluate the permutation.

- 23) $5P_5$ 23) _____
- A) 120 B) 4 C) 1 D) 0

Solve the problem.

- 24) Find the number of different subsets of the set {mom, dad, son, daughter}. 24) _____
- A) 14 B) 16 C) 8 D) 12

Provide an appropriate response.

- 32) Consider the following counting problem. A pool of possible jurors consists of 11 men and 13 women. How many different juries consisting of 5 women and 7 men are possible? 32) _____

To solve this problem, which of the following rules would you use?

- A) Both the permutations rule and the fundamental counting principle
- B) Both the combinations rule and the fundamental counting principle
- C) The combinations rule only
- D) The fundamental counting principle only

Solve the problem.

- 33) Of the 2,598,960 different five-card hands possible from a deck of 52 cards, how many contain at least one red card? 33) _____
- A) 2,598,959 hands B) 1,266,590 hands C) 2,467,400 hands D) 2,533,180 hands

If two fair dice, one red and one white, are rolled, in how many ways can the result be obtained?

- 34) The white die shows a 3. 34) _____
- A) 3 ways B) 1 way C) 6 ways D) 5 ways

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

- 35) At least one die shows a 3. 35) _____
- A) (3, 1), (3, 2), (3, 4), (3, 5), (3, 6), (1, 3), (2, 3), (4, 3), (5, 3), (6, 3)
- B) (3, 1), (3, 2), (3, 4), (3, 5), (3, 6)
- C) (3, 3)
- D) (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (1, 3), (2, 3), (4, 3), (5, 3), (6, 3)

Using the 36 possibilities found in the product table for rolling two dice, list and count the outcomes for which the sum (for both dice) is the following.

- 36) Between 7 and 10 36) _____
- A) (2,6), (6,2), (3,6), (6,3), (5,3), (3,5), (4,4), (4,5), (5,4), (3,4), (4,3), (6,4), (4,6), (5,5); 14
- B) (2,6), (6,2), (6,3), (3,6), (5,3), (3,5), (4,4), (4,5), (5,4); 9
- C) (2,6), (3,6), (5,3), (4,4), (4,5); 5
- D) (2,6), (6,2), (6,3), (3,6), (5,3), (3,5), (4,5); 8

Solve the problem.

- 37) Four accounting majors, two economics majors, and three marketing majors have interviewed for five different positions with a large company. Find the number of different ways that five of these people could be hired if the first position is to be filled by an accounting major, the second position is to be filled by an economics major, the third position is to be filled by a marketing major, and the last two positions can be filled by any major. 37) _____
- A) 2,160 B) 48 C) 4,320 D) 720

Read each combination value directly from Pascal's Triangle.

38) $7C7$

38) _____

- A) 1 B) 0.5 C) 1260 D) 5040

Solve the problem.

39) How many 10-digit telephone numbers (area code + number) are possible if the first digit cannot be zero, the first three digits cannot be 800 or 900, and the number must end in 0000?

39) _____

- A) 654,642 B) 899,000 C) 900,000 D) 898,000

If two fair dice, one red and one white, are rolled, in how many ways can the result be obtained?

40) A 5 is on at least one of the dice.

40) _____

- A) 12 ways B) 11 ways C) 6 ways D) 10 ways

Solve the problem.

41) If a given set has eight elements, how many of its subsets have at most three elements?

41) _____

- A) 163 subsets B) 93 subsets C) 92 subsets D) 56 subsets

Use a tree diagram showing all possible results when four fair coins are tossed. Then list the ways of getting the indicated result.

42) at least two tails

42) _____

- A) hhtt, htht, htth, thht, thth, tthh
B) hhtt, htth, hhtt, thht, thth, tthh, ttth, tttt
C) hhtt, htth, htth, hhtt, thht, thth, thtt, tthh, ttth, tttt
D) hhtt, thtt, ttth, ttth, tttt

Solve the problem.

43) Four married couples have reserved eight seats in a row at the theater, starting at an aisle seat. In how many ways can they arrange themselves if no couple is to be separated?

43) _____

- A) 384 B) 192 C) 40,320 D) 24

44) How many two-digit counting numbers are either multiples of 2 or multiples of 3?

44) _____

- A) 15 numbers B) 61 numbers C) 75 numbers D) 60 numbers

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

45) The second die shows a 3.

45) _____

- A) (3,3) B) (1,3),(3,3),(5,3)
C) (1,3),(2,3),(3,3),(4,3),(5,3),(6,3) D) (1,3),(2,3),(4,3),(5,3),(6,3)

Evaluate the expression.

46) $8C8$

46) _____

- A) 40,320 B) 0.5 C) 10,080 D) 1

Solve the problem.

- 47) If 11 newborn babies are randomly selected, how many different gender sequences are possible? 47) _____
A) 39,916,800 B) 2048 C) 121 D) 22

Read each combination value directly from Pascal's Triangle.

- 48) $6C_1$ 48) _____
A) 6 B) 240 C) 3 D) 720

Evaluate the factorial expression.

- 49) $\frac{5!}{4!}$ 49) _____
A) $\frac{5}{4}$ B) 1 C) 5! D) 5

Evaluate the permutation.

- 50) $8P_4$ 50) _____
A) 1 B) 8 C) 1680 D) 336

Solve the problem.

- 51) Four married couples have reserved eight seats in a row at the theater, starting at an aisle seat. In how many ways can they arrange themselves if all the women sit together and all the men sit together? 51) _____
A) 576 B) 48 C) 1152 D) 256

Evaluate the factorial expression.

- 52) $\frac{n!}{r!(n-r)!}$, where $n = 33$ and $r = 5$ 52) _____
A) 237,336 B) 982,080 C) 1056 D) 32,736

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

- 53) The sum of the numbers showing is 5. 53) _____
A) (3,2),(4,1) B) (2,3),(4,1)
C) (1,4),(2,3),(3,2),(4,1) D) (2,3),(3,2)

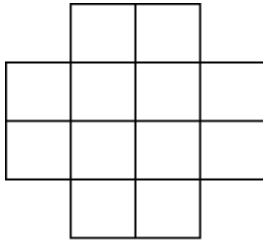
Evaluate the expression.

- 54) $8C_4$ 54) _____
A) 48 B) 840 C) 70 D) 1680

Determine the number of figures (of any size) in the design.

55) Squares (of any size)

55) _____



A) 13

B) 18

C) 12

D) 17

Using the 36 possibilities found in the product table for rolling two dice, list and count the outcomes for which the sum (for both dice) is the following.

56) Equal to 8

56) _____

A) (2,6), (3,5), (4,4), (5,3), (6,2); 5

B) (2,6), (3,5); 2

C) (2,6), (3,5), (4,4), (4,4), (5,3), (6,2); 6

D) (2,6), (3,5), (4,4); 3

Solve the problem.

57) If you toss six fair coins, in how many ways can you obtain at least two heads?

57) _____

A) 58 ways

B) 57 ways

C) 64 ways

D) 63 ways

58) Construct a product table showing all possible two-digit numbers using digits from the set {1, 2, 6, 7}. List the numbers with repeating digits.

58) _____

A) {11, 66, 77}

B) {22, 66}

C) {11, 22, 66, 77}

D) none

59) If a license plate consists of four digits, how many different licenses could be created having at least one digit repeated.

59) _____

A) 10,000 licenses

B) 4960 licenses

C) 3024 licenses

D) 5040 licenses

60) If a given set has nine elements, how many of its subsets have at least five elements?

60) _____

A) 130 subsets

B) 32 subsets

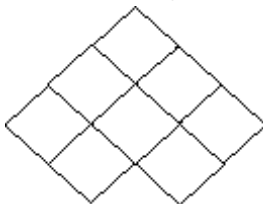
C) 256 subsets

D) 255 subsets

Determine the number of figures (of any size) in the design.

61) Squares (of any size)

61) _____



A) 8

B) 12

C) 9

D) 11

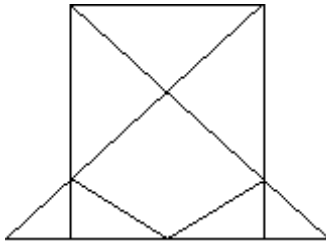
Solve the problem.

- 62) Of the 2,598,960 different five-card hands possible from a deck of 52 playing cards, how many would contain all clubs? 62) _____
A) 1,287 B) 143 C) 3,861 D) 2,574

- 63) Find the number of different three-member committees that could be selected from the group of {Mary, Norman, Paula, Raymond, Sally} given that there must be two women and one man on the committee. 63) _____
A) 6 B) 8 C) 1 D) 3

Determine the number of figures (of any size) in the design.

- 64) Triangles (of any size) 64) _____



- A) 10 B) 14 C) 9 D) 12

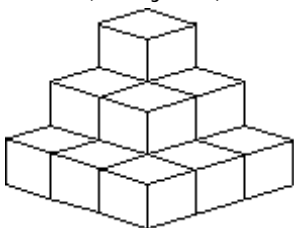
Solve the problem.

- 65) A baseball manager has 10 players of the same ability. How many 9 player starting lineups can he create? 65) _____
A) 3,628,800 B) 10 C) 362,880 D) 90

- 66) In how many ways can 8 people line up for play tickets? 66) _____
A) 8 B) 40,320 C) 16,777,216 D) 1

Determine the number of figures (of any size) in the design.

- 67) Cubes (of any size) 67) _____



- A) 15 B) 9 C) 14 D) 10

Using the 36 possibilities found in the product table for rolling two dice, list and count the outcomes for which the sum (for both dice) is the following.

68) Less than 4 68) _____

A) (1,1), (1,2), (2,1), (1,3), (3,1), (2,2); 6

B) (1,1), (1,2), (2,1); 3

C) (1,1), (1,2); 2

D) (1,1), (2,2), (1,2), (2,1); 4

Solve the problem.

69) Find the number of different subsets of the set {8, 9, 10}. 69) _____

A) 7

B) 6

C) 8

D) 3

Provide an appropriate response.

70) Consider the following counting problem. Allison is trying to decide which three of her eight new books to take on vacation with her. How many different ways can she choose the three books? 70) _____

To solve this problem which of the following rules would you use?

A) The permutations rule only

B) Both the permutations rule and the fundamental counting principle

C) The fundamental counting principle only

D) The combinations rule only

Evaluate the permutation.

71) Determine the number of permutations of 10 things taken 6 at a time. 71) _____

A) 1

B) 10

C) 720

D) 151,200

Use a tree diagram showing all possible results when a die is rolled twice. List the ways of getting the following result.

72) Exactly one die shows a 3. 72) _____

A) (3,3)

B) (3, 1),(3, 2),(3, 4),(3, 5),(3, 6), (1, 3), (2, 3), (4, 3), (5, 3), (6, 3)

C) (3, 1),(3, 2),(3, 3), (3, 4),(3, 5),(3, 6), (1, 3), (2, 3), (4, 3), (5, 3), (6, 3)

D) (3, 1),(3, 2),(3, 4),(3, 5),(3, 6)

Solve the problem.

73) Which statement is true about row 6 in Pascal's Triangle? 73) _____

A) Each entry (except for the 1s) is the sum of the two nearest entries in the row above it.

B) The sum of all entries in the row equals 6.

C) The only entries in the row are 0 and 6.

D) There are always $\langle a \rangle$ entries equal to 6.

74) How many three-digit numbers have the sum of their digits equal to 20? 74) _____

A) 36

B) 30

C) 32

D) 40

75) For a set of 10 elements, find the number of different subsets of size 5.

A) 240

B) 30,240

C) 15,120

D) 252

75) _____