

HACKING MATHEMATICS



ANSWERS TO PRACTICE EXERCISES

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|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. B | 2. A | 3. C | 4. A | 5. D | 6. A |
| 6*. A | 7. C | 8. B | 9. D | 10. C | 11. B |
| 12. A | 13. B | 14. C | 15. A | 16. A | 17. C |
| 18. D | 19. A | 20. B | 21. B | 22. D | 23. D |
| 24. D | 25. B | | | | |

UNIT 3 MODULE 2

23. $C(15,3)$ = the number of

- A. ways to choose a President, Vice-President, and Secretary from a 15-member club.
- B. 3-element subsets in a 15-element set. C. 12-element subsets in a 15-element set.
- D. B & C are both correct. E. none of these.

24. In a pet shop, there are 6 kittens. One kitten will be declawed, another kitten will be given a rabies vaccination, and yet another will be given a distemper shot. In how many ways can the selection be made? (This means, for instance, that if Fluffy gets the distemper shot, Buffy gets declawed and Whiskers gets the rabies vaccine, then this selection differs from one where Buffy gets the distemper shot, Whiskers gets declawed and Fluffy gets the rabies vaccine.)

- A. 18 B. 20 C. 60 D. 120

25. In a pet shop, there are 6 kittens. Three kittens will be donated to a nursing home. How many different 3-kitten groups are possible?

- A. 18 B. 20 C. 60 D. 120

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14. A couple is expecting the birth of a baby boy. They will name the boy by choosing a first name and a middle name from this list of their favorite boys' names:

Billy, Bobby, Buster, Bubba. They have not ruled out the possibility that the child's first and middle names will be the same (example: Billy Buster, Buster Billy, and Bubba Bubba are three different, valid possibilities). How many different names are possible?

- A. 12 B. 144 C. 16 D. 64

15. Same as #14 above, except the first and middle names will be different.

- A. 12 B. 144 C. 16 D. 6

16. There are seven greyhounds running in a race. How many different 1st-2nd-3rd place orders of finish are possible?

- A. 210 B. 243 C. 35 D. 18

17. There are seven greyhounds running in a race. After the race, three of the dogs will be randomly selected for veterinary examination. How many different groups of 3 dogs are possible?

- A. 210 B. 243 C. 35 D. 18

18. A jar contains a penny, a nickel, a dime, a quarter, and a half-dollar and silver dollar. Two coins are selected (without replacement) and their monetary sum is determined. How many different monetary sums are possible? (Examples: dime, quarter: 35¢; nickel, half-dollar: 55¢.)

- A. 36 B. 64 C. 30 D. 15

19. In a jail cell, there are 5 Democrats and 6 Republicans. Four of these people will be chosen for early release. How many 4-person groups are possible?

- A. 330 B. 7920 C. 150 D. 1,663,200

20. Same as #19, except that 2 Democrats and 2 Republicans will be chosen.

- A. 160 B. 150 C. 50 D. 600

21. Same as #19, except 4 people will be chosen for a police line-up. How many different line-ups are possible?

- A. 330 B. 7920 C. 150 D. 1,663,200

22. Same as #21, except 2 Democrats and 2 Republicans will be chosen for a police line-up, with the Democrats on the left and the Republicans on the right.

- A. 160 B. 150 C. 50 D. 600

UNIT 3 MODULE 2

A. 10 B. 24 C. 36 D. 210

8. In how many different ways is it possible to answer an 8-question true/false quiz?

A. 28 B. 256 C. 56 D. 16

9. 6 diplomats, representing 6 different nations, meet for a peace conference. At the outset, each diplomat shakes hands once with each other diplomat. How many handshakes occur?

A. 12 B. 36 C. 64 D. 15

10. The ships of the navy of Middle Tyrania communicate via a method identical to that described in #2 above, except that all six of the flags are arranged on the mast in order to form a code. How many different codes are possible?

A. 120 B. 36 C. 720 D. 12

11. A 'combination' lock has a dial bearing the numbers 1 through 20. How many different 3-number 'combinations' are possible if there are no restrictions on the 3 numbers (example: 19-5-1, 5-19-1, 3-3-12 are three different, valid 'combinations').

A. 6840 B. 8000 C. 60 D. 1140

12. Referring to #11 above, how many different possibilities are there if the only restriction is that a 'combination' cannot have any repeated number (example: 5-17-5 is not valid)?

A. 6840 B. 8000 C. $20!3!$ D. $20! - 3!$

13. $P(9,5)$ = the number of:

- A. 5-element subsets in a 9-element set
- B. ways for 5 people from a group of 9 to be arranged on a bench
- C. 4-element subsets in a 9-element set
- D. all of these

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PRACTICE EXERCISES

1. How many different outcomes are possible if a coin is tossed 5 times?
(examples: HTTHT, THTHT, and TTHTT are three different outcomes.)

- A. 10 B. 32 C. 20 D. 25

2. Ships of the navy of Outer Tyrania communicate at sea via code signals transmitted by flags, as follows: each ship has six flags (the same set of six flags is on every ship); a code is formed by choosing three flags and arranging them, from top to bottom, on the mainmast. How many different codes are possible? Example:



"don't pull that
big plug in the
bottom of the
boat"

differs from



"if you sail too
close to the
edge, you'll fall
off"

- A. 120 B. 18 C. 40 D. 10

3. A couple is expecting the arrival of a baby girl. They'll name the child by choosing a first and middle name from this list of their favorite girls' names: Ann, Beth, Carrie, Donna, Edna. The first name will be different from the middle name. (Example: Ann Beth, Beth Ann, and Edna Beth are three different names. Beth Beth is not a valid name.) How many different names are possible?

- A. 25 B. 32 C. 20 D. 10

4. Ships of the navy of Inner Tyrania communicate at sea via a method similar to the one described in #2 above, except: each ship has seven flags, and the code is determined exclusively by the 3 flags chosen, and not by the order in which they are arranged on the mast. How many different codes are possible?

- A. 35 B. 210 C. 343 D. 128

5. There are 8 teams in a football conference. Each team must play all of the other teams one time. How many games will be played?

- A. 16 B. 64 C. 56 D. 28

6. Al, Beth, Chuck, Dora, and Ed have won 3 tickets to the opera. They will randomly choose which 3 of them get to attend the performance. How many different 3-person groups are possible? (Note: you should realize that in this case, the outcome BCA, for instance, is the same as the outcome CAB.)

- A. 10 B. 20 C. 243 D. 60

6*. Groucho, Harpo, Chico, Zeppo and Gummo have won 2 tickets to the opera. They will randomly choose which two of them have to attend. How many different 2-person groups are possible? A. 10 B. 20 C. 243 D. 60

7. The uniform for a marching band consists of: 2 different hats, 2 different types of shoe, 3 different jackets, and 3 kinds of trousers. How many different uniform configurations are possible, assuming that a uniform configuration is determined by the hat, shoe, jacket and trouser?