

1. Anthony and Bret have equal amounts of money.

Each of them has at least 5 dollars.

How much should Anthony give to Bret so that Bret has 10 dollars more than Anthony?

2. Ada, Bella and Cindy have some books.

- Bella has one more book than Ada.
- Cindy has one more book than Bella.
- Together, the three of them have 18 books.

How many books does each girl have?

3. The weight of two papayas equals to the weight of a half of a papaya plus 3 pounds. How much does a papaya weigh?

4. Convert the following binary numbers to decimal numbers:

10 =

101 =

110 =

5. Jane picked a number. She multiplied it by 2 and added 1 and got 15.
What is her number?

6. There are 20 students. Each student plays either soccer or basketball or both.

- 12 students play soccer.
- 2 students play soccer and basketball.

How many students play basketball only?

7. Halloween was on a Saturday in 2009. What day of the week will it be this year, in 2010? There are 365 days in a year.

9.

- a. How many faces are there on a square pyramid?
- b. How many vertices are there on a square pyramid?
- c. How many edges are there on a square pyramid?
- d. What is the formula we learned regarding faces, vertices, and edges?

10. Tom took his age, added 1 and multiplied it by 2. He got 16. What is Tom's age?

11. Find a good way to compute the sum of the integers 1 through 10.

12. There are chickens and cows on a farm.

There are 9 heads and 26 legs.

How many cows are there?

How many chickens are there?

13. Negate the following statements:

a. All children like pizza

b. Some trees are purple

14. There are 20 students. Each student likes either apples or pears or both.

- 10 students like apples
- 15 students like pears.

How many students like both?

16. For each implication, state whether it is true or false. If it is false, provide a counterexample:

“If a vegetable is green, then it is a zucchini”

“If a student is in Junior Circle, then he or she is in the fourth grade”

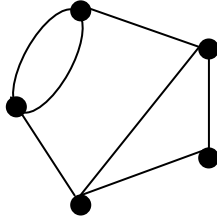
17. A graph has

- 5 vertices and 5 edges
- 3 vertices have exactly one edge attached to it.
- 3 vertices have odd degree

Two of these statements are true and one statement is false. Which statement must be false?

18. Granny Smith has two children. Each of her two children had two children. Each of her grandchildren had one child. How many great grandchildren does Granny Smith have?

19. A graph has an Euler path if a path can be traced to hit every vertex without going over the same edge more than once. Does the graph below have an Euler path?

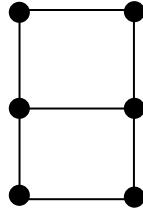


20.

a. What is the probability of getting heads when you flip a coin?

b. What is probability of getting 2 heads when you flip a coin twice?

21. What is the smallest number of colors needed to color the vertices of the graph below, so that no vertices that share an edge have the same color?



22. How many different outcomes are there when I roll a single die twice?

23. Suzy has 5 shirts and 4 skirts. How many possible outfits consisting of a shirt and skirt does she have?

24. How many possible 2 letter words can you make with the letters A,B,C,D if:

a. You are not allowed to repeat letters?

b. You are allowed to repeat letters?

25. How many possible flips through an axis of symmetry are there for the triangle?

26.

a. Give an example of two transformations that commute for the square.

b. Give an example of two transformations that do not commute for the square.

27. Add in binary: $101+10$

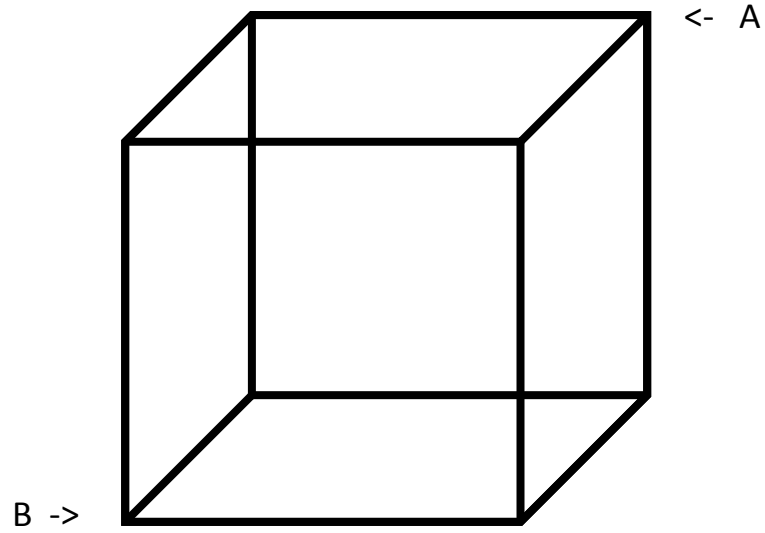
Subtract in binary: $111-101$

28. There are three brothers in a family. This year:

- The first is twice as old as the second.
- The second is twice as old as the third.
- The sum of their ages is 21.

How old are the brothers?

29. Draw the shortest path on the surfaces of a cube connecting the points A and B.



30. Write down the smallest three digit number using the digits 1, 9, 4, 3.