

1. What fraction of the letters in SINUSOIDAL are consonants?
2. If I am three years younger than Jae, Jae is 5 years older than Ben, and Ben is 13, how old am I?
3. Arthur wants a new bicycle. He earns \$2 a day for taking out the trash. If the bicycle costs \$30, how many days must Arthur take out the trash for?
4. I have \$1.25. If I spend one-fifth of it, how much money, in dollars, do I have left?
5. Martin believes that he can predict his score on the BCA Math Competition. He thinks he knows enough to answer 35 questions correctly. However, He knows that he is careless, so he subtracts 15 due to careless errors. Then he adds 5 questions to his total, because checking over his work will eliminate some errors. How many questions does Martin think he can answer correctly in his final prediction?
6. If 28 people were on a bus initially, and at the Hackensack stop, 13 people came onto the bus and 17 people went off the bus, how many people are on the bus after the Hackensack stop?
7. Calculate  $3.14+1.41+4.159$ .
8. Kevin Lee wants to be 7 inches taller than Yao Ming, who is 7 feet 5 inches tall. However, being 5 feet 6 inches, he needs to stand on a table to achieve this height. How high, in inches, does the table need to be? (12 inches equals 1 foot)
9. If  $\frac{5}{12}$  of the population watch CNN,  $\frac{5}{24}$  watch MSNBC, and  $\frac{5}{18}$  watch Fox News, then what fraction of the population watch one of the three? (Assume that no person watches more than one news channel)
10. Josh needed some help writing questions for the Academy Competition. He received 5 questions from each person that sent him an email. He received 2 emails the first week, 3 emails the second week, and so on until he received 8 emails the seventh week. How many questions did Josh receive in total?
11. If a blip is half a second, how many blips are there in 1 day (3600 seconds in an hour and 24 hours in a day)?
12. The National Quizbowl Tournament has a registration fee of \$500 per team. Each member's plane ticket costs \$250 and the hotel rooms cost \$60 per person. If 4 people attend the tournament and share the total fees equally, how much does each person pay in dollars?
13. It is the year *Googleplex* and the whole world is voting for 1 President. Electoral College votes are distributed by the fraction of the world population. If China has  $\frac{1}{3}$  of the world's population and India has  $\frac{3}{8}$  of the world's population, and there are 2400 Electoral College votes, then how many of these votes are given to China and India?
14. For how many integers between 2 and 102 is the square root of the integer also an integer?

15. Math team, AAST, wants a new name. We create the new name by changing the ordering of the letters AAST. However, we wanted to keep the T at the end of AAST. How many *new* names can we make keeping to the stated conditions?
16. Walt Disney's stock starts at \$100 dollars per share. If the stock rises 20% and falls by 20% of the new price, what is the new stock price in dollars?
17. How many positive factors does 72 have?
18. The cost of BCA math camp is \$50 per student. However, Mr. Holbrook buys 5 dozen donuts every day for the 16 days. If donuts cost \$10 per dozen, how many students need to attend math camp in order for Mr. Holbrook to break even?
19. Jill has to walk down a hill to get to school every day, and up that hill to return from school to home. On her way to school, she travels 77 meters in 4 minutes. On her way back from school, she needs 7 minutes to travel 77 meters. Find her average speed on her round trip, in meters/minute.
20. Gary the snail falls into a hole in Spongebob's bed. The hole is 51 centimeters deep. Gary climbs 3 centimeters every day, but at night, if he is still in the hole, he falls back 1 cm. How many days will it take Gary to escape the hole?
21. Rajesh does testing on some mice he catches. Mouse A eats a bag of Cheetos in 6 hours and Mouse B eats a bag of Cheetos in 3 hours. How long, in hours, will it take for mice A and B to eat a bag of Cheetos together?
22. If 1 Tom is equal to 7 Fan, 2 Harry is equal to 1 Husk, and 14 Tom is equal to 1 Husk, then how many Fan make up a Harry?
23. Annie, Bill, and Charlie each do two problems a day while Dick only does one. They take problems from a database and each problem blows up after they solve it. It takes 24 days for the questions to run out. If Dick decides to do 2 questions a day, how long, in days, will it take the group to finish all questions from a database with the same number of problems as the previous one?
24. 300 Students attend Senior Prom, while 250 attend the Senior trip. If there are 500 students who attended at least one of the events, then how many people attended both events?
25. Calculate  $1 - 2 \times 3 - 2 \times 5 + 54 - (74 - 57) + 17^0$ .
26. Chris owns a shop that sells rabbits and chickens (rabbits have 4 legs, chickens have 2). He counts 402 total animals and 1422 total legs, how many chickens are there in Chris's store?
27. Mary bakes a pie that starts off at 300 degrees, but it cools at a rate of 4 degrees per second. The room she is in is initially at 50 degrees, but heats up at a rate of 0.5 degrees per second. How long will it take for the room to reach half the temperature of the pie?
28. If the sum of the cost of a bag of Cheetos and a bag of popcorn is 61 cents, a bag of popcorn and a bag of Doritos is 43 cents, and a bag of Doritos and a bag of Cheetos costs 54 cents, what is the

- total price, in cents, for a bag of each kind?
29. If the sides of any square are increased 60%, by what percentage does the area of the square increase?
30. If  $\frac{a + 3b}{a - b} = 3$  and  $a \neq b$ , what is the value of  $\frac{a}{b}$ ?
31. Jon Chu has been working out since two years ago. In his last game, he hit 2 doubles and two home runs in 4 at-bats. His slugging average before the game was 1.000 in ten at-bats. What's Jon Chu's new slugging average after the game, expressed as a fraction?  
 (*Slugging Average* =  $\frac{\text{Total Bases}}{\text{Total at - bats}}$ , and a double is 2 total bases and a home run is 4 total bases)
32. Yoonjoo wants to sell 60 identical pencils in groups of 5 or 2. In how many ways can the pencils be grouped?
33. A *funny* number is a number that is the product of two consecutive primes (neighboring numbers when all numbers other than primes are taken out), such as  $5 \times 7 = 35$ . What is the least common multiple of the 3 smallest "funny" numbers?
34. In a single elimination chess tournament (a person is eliminated once he loses), how many games will it take to decide a winner if there are 2006 participants?
35. The radius of a circle is twice the edge of a cube. If the surface area of the cube is 24, find the area of the circle in terms of  $\pi$ .
36. Tom and Chris love horseracing. Tom has horses A, C, and E while Chris has horses B, D, and F. The speed of the horses from fastest to slowest is A, B, C, D, E, and F (no horses are equally quick). Tom and Chris randomly select horses to race against each other, resulting in three races (no horse races twice). To win, a person must win at least two of the three races. What is the probability that Chris wins?
37. If  $x$  and  $y$  are positive integers, and  $x + y + xy = 34$ , what is the value of  $x + y$ ?
38. A palindrome is a number that reads the same whether read front to back or back to front (like 13231). Compute the number of palindromes between 10 and 1000.
39. My watch *bips* every minute. Jim's watch *bops* every 62 seconds. If our *bip* and *bop* coincide at 12:00 pm, what is the next time our *bip* and *bop* coincide?
40. The terms  $\sqrt[8]{3}$ ,  $\sqrt[4]{3}$ , and  $x$  form a geometric sequence. If  $x$  is in the form  $3^y$ , find  $y$ .
41. In isosceles triangle ABC,  $AB = AC$ . Let K be a point on AB and L a point on AC. KL is extended through L to meet the extension of BC at M. If  $KL = LM$ , what is the ratio  $\frac{KB}{LC}$ ?
42. Let ABC be a triangle. Suppose that  $AB = x + 4$ ,  $BC = x + 7$  and  $AC = 4x$  and  $x > 0$ . For angle CAB to be the largest angle of the triangle,  $x$  must satisfy  $m < x < n$ . What is the greatest possible

- value of  $n - m$ , expressed as a common fraction in lowest term?
43. Josh runs twice as fast as he walks. When going to school on Monday, he walks for twice the time he runs and takes 20 minutes. On Tuesday, he runs for twice the time he walks. How many minutes does it take Josh to get to school on Tuesday?
  44. Grandpa Bernoulli leaves all his money to his grandchildren in the following manner: \$1000 to the oldest and one-tenth of the remaining amount of money (after subtracting the \$1000); \$2000 to the second oldest and one-tenth of the remaining money (subtracting the \$1000, the one-tenth, and the \$2000); then \$3000 to the third oldest and one-tenth of the remaining money, and so on after that. After the money was distributed, all the grandchildren had the same amount of money. How many grandchildren did Bernoulli have? (Note: the answer is greater than 1)
  45. The tortoise and the hare engage in a two day math competition. Each answers 12 questions in total. We know that each of them answered at least one question each day, although the number of questions they answered is not necessarily equal, and that the tortoise had a lower percentage of correct answers on both days. The hare answered 2 questions correct out of 6 the first day, and 4 questions out of six the second day. What is the maximum number of correct answers that the tortoise can achieve?
  46. Aaron Burr and Alexander Hamilton have a pistol duel. Burr has a  $\frac{1}{3}$  chance of hitting Hamilton, while Hamilton has a  $\frac{1}{4}$  chance of hitting Burr. A round consists of Burr firing, and then Hamilton firing, so if Burr hits, he wins without being fired back upon. If no one hits, the duel contains for more rounds until someone hits. What is the chance that Burr wins the duel?
  47. Caroline and Molly grade the BCA Math Competition tests. Caroline grades 95% of questions correctly (wrong if the answer is wrong, correct if the answer is correct) but Molly only catches mistakes at a rate of 50% (Molly always agrees with correctly graded questions). If the pair is awarded \$1 for grading a question correctly, but is fined \$5 for incorrectly grading a question, then how much money can they expect to make by grading a 40 question test?
  48. PQR is a right triangle with right angle R. Points S and T trisect the hypotenuse PQ. RT has length 9 cm and RS has length 7 cm, what is the length of ST?
  49. Michelle has 20 coins in her purse. There are only 10 pence, 20 pence, and 50 pence coins and the total value of the money is 500 pence. If she has *more* 50 pence coins than 10 pence coins, how many 10 pence coins does she have?
  50. HSK tennis balls come in cylindrical packages with 3 tennis balls inside. The centers are collinear and the balls fit exactly into the cylinder. What proportion of the cylinder's volume is occupied by the three balls?