

Winter Math Contest: Cheetah Level

Math Power

December 15, 2024

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🏠 site: <http://www.MathEnglish.com>

By Dr. Li

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Name:
(First) _____ (Last) _____

Score: _____

School: _____ Grade: _____

Parent's Name: _____ Date: ____/____/____

Parent's Signature: _____ Parent's Email: _____@_____

1. This contest is conducted under my supervision.
2. There is no time limit for this contest.
3. No calculator/device should be used.
4. This test is not for distribution.
5. No email should be used for submission.

I choose to

By 1/6 Mail-in this test in stapled hardcopy: P. O. Box 10893, Rockville, MD 20849

By 1/8 Drop-In this test in stapled hardcopy: 10101 Molecular Dr, Ste 100, MD 20849 (3:00 – 6:30 pm)

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Question set [1 - 2]

Molly sings in the chorus at her school. In the chorus, $\frac{3}{5}$ of the students are in the sixth grade, and the rest are in the fifth grade.

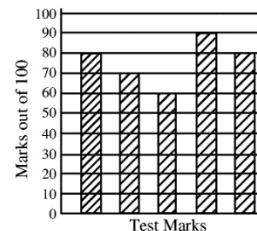
1. What fraction of the students in the chorus are in the fifth grade?
2. There are 35 students in the chorus. What is the total number of students in the chorus who are in the fifth grade?
3. If a car can travel 120 miles on 6 gallons of gas, how much gas is needed for a 480-mile trip?
4. Sarah's car gets about 27 miles per gallon and can travel a maximum of 432 miles without refueling. What is the maximum number of gallons of gas the tank in Sarah's car can hold?

5. Mitchell earns \$10.00 an hour. He gets a raise of $\frac{1}{5}$. How much more is he now earning in a week (8 hours a day, 5 days a week)?

6. The value of $(\frac{5}{6})^2$ is
 - A) between $1\frac{1}{2}$ and 2
 - B) between $\frac{1}{2}$ and 1
 - C) greater than 2
 - D) between 0 and $\frac{1}{2}$
 - E) between 1 and $1\frac{1}{2}$

7. $(1\frac{1}{2})^3 =$

8. Jean writes five tests and achieves the marks shown on the graph. What is her average mark on these five tests?



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9. Subtract 9 from a number and multiply it by 3. It will become 39. What is this number?

14. $\frac{2}{1+\frac{3}{4}} =$

10. A model railroad engine is 9 inches long. If the model is $\frac{1}{8}$ the size of the actual engine, how many feet is the actual one? (Hint: 1 foot = 12 inches)

15. $\sqrt{\frac{4}{9}} =$

11. An SUV can travel 240 mi on 8 gal of gas. A minivan can travel 299 mi on 11 gal. Which vehicle is more efficient?
A) SUV
B) minivan
C) both the same

16. 20% of 20% of 20 =

12. The Kwans' car used 8 gallons of gas to travel 184 miles. How many miles did the car travel per gallon?

17. A painter uses $13\frac{1}{2}$ in. of wire to hang each painting. He has $13\frac{1}{2}$ ft of wire. How many paintings can he hang?

13. Bill earns \$376 for a 40-hour week. If he missed 5 hours of work last week, how much did he get paid?

18. The total of all scores on an eighth grade mathematics test was 2,400 points. The average (mean) score was 80 points. If there are 14 girls in the class, how many boys are there?

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19. A coat was priced at \$80. It is now sold at 70% of its original price. What is the price now?
20. On the first day of registration, 60 children were enrolled in a new daycare center, making the center 30% full. How many more children can the center admit?
21. Charles and Dave both had \$100. Charles spent 50% of his money on cards collection. Dave spent 20% of his money on toys, then spent 30% of the remaining money on cologne. Who has more money, and by how much?
22. Sandy has some blouses that cost her \$25 each. She wants to sell them at a profit of 80% of the cost. What price should she charge for each blouse?
23. Martin charges 2% commission for selling fruit. How much can he make in commission for selling 100 crates of oranges at \$16 per crate?
24. If 50% of a number is 20, what is 75% of the number?
25. If 6 students, 20% of the class, were born outside the United States. How many students were born in the United States?
26. Sarah's salary was \$25,000 last year and she gets \$30,000 this year. What is the percent increase from last year?
27. In a school election, Danny won the presidency with 300 votes, which was 75% of the total votes cast. How many votes were cast in total?
- Question set [28 - 29]*
- After the first day registration, 84 children had been enrolled in a new day care center, which make the center 70% full.
28. What is the total number of children when the center is full?

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29. How many more children can be admitted into the center?
34. If there is a 5% sales tax, how much would two calculators cost after tax?

Question set [30 - 31]

The original price of a controller for N64 was \$40.

30. Last year, the price was 15% higher. What was the price last year?

31. There is a 25% discount now. What is the discounted price of the controller?

32. The price a solar calculator has increased by 20%. If it was \$60 last year, what is the price this year?

Question set [33 - 34]

A solar calculator cost at \$60 last year.

33. The price went up 20% this year. What is the new price?

35. Five employees are absent from work because of the flu. If 75% of the employees are present, how many employees are at work?

36. A programmable robot manufactured by Lego was sold at \$200 last year. It is sold for \$240 this year. What is the percent increase of the price of the toy this year?

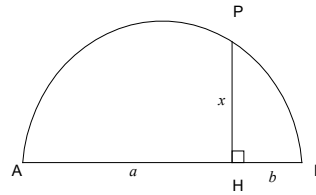
37. Mr. Fang sold two cars costing \$12,000 and \$7,600. If he made a profit of 8% on the first sale, and a loss of 10% on the second sale, what is the amount of the loss or gain on the entire sale?

38. A retailer has some skirts that cost her \$30. If she sells them for \$39, find her rate of profit based on the cost.

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39. With 60 children enrolled in a new daycare program, the center is 30% full. How many more children can the center admit?

44. In a semicircle, PH is perpendicular to AB.



It can be shown that $\frac{a}{x} = \frac{x}{b}$. If $a = 50$ and $b = 2$, find x .

40. Henry and George receive the same hourly wage. Henry worked 4 hours and George $2\frac{1}{2}$ hours. As the result, Henry earned \$21 more. How much did they earn in total?

Question set [45 - 47]

A baseball team won 30% of their 60 games played during June.

45. How many games were won and lost?

Question set [41 - 42]

The tens digit of a certain number is five more than the units digits. The sum of the digits is 9. Find the number.

41. Use “Guess-N-Check” to solve the problem.

46. Starting in July, the team won 10 games in a row. What is the winning percentage?

42. Use an unknown to solve the problem.

47. Starting from June, how many games must the team win in a row to attain a 50% winning percentage?

43. Mr. Gao made a 30% down payment of the total cost of a used car. If the down payment was \$825, what is the total cost of the used car?

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48. A man covers f feet in m min. How long (in hours) will it take him to cover y yards? (1 yd = 3 ft)

The bleacher seats of Central Stadium are arranged as below. Assume the pattern continues for all the rows in the stadium.

row 1	1				
row 2	2	3			
row 3	4	5	6		
row 4	7	8	9	10	
row 5	11	12	13	14	15

Question set [49 - 51]

A car leaves a town at 40 miles per hour. Two hours later a second car leaves the town traveling the same route. Find out the results in different situations.

49. How long would it take the second car to overtake the first car if the second car is traveling at 60 miles per hour? ^{*}

50. How much faster than the first car should the second car travel to overtake it in 5 hours?

51. How fast should the second car travel to overtake it in 5 hours and 20 minutes?

52. What is the number of the seat in 7th row and 4th column?

53. In which row would you find seat 100? In which column would you find seat 100?

54. There were three times as many women as men in the Drake concert. If there were a total of 600 people, how many men and women were there?

55. Mitch is three-fourths as old as his sister Candy. In 8 years he will be five-sixths as old as Candy. Find their present ages.

Question set [52 - 53]

^{*} How far away is the first car when the second is about to start? It is $40 \times 2 = 80$ (miles).

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56. If John drove 400 miles in 6 hours and 15 minutes, what was his speed?

61. The sum of two consecutive odd integers is 68. Find the integers.

57. School bus fares rose from \$25 per month to \$30 per month. Find the percent of increase.

Question set [62 - 63]

Joyce saw a sweater that was originally \$60 but was on sale for 20% off. There is a 15% successive discount if the customer applies the credit card.

58. Jesse used 10 gallons of gasoline to drive 170 miles. How much gasoline will he need to travel 238 miles?

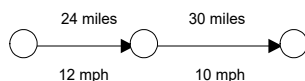
62. If Joyce decides to apply a credit card, the price of sweater is $\$60 \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$.

59. Express in simplest form the following ratio: 15 hours to 3 days.

63. If Joyce buys a sweater and applies for a credit card, how much money will she save?

60. A boy rides his bicycle 24 miles at a speed of 12 mph, and then 30 miles at a speed of 10 mph. What is the average speed for the entire trip?

64. Joe and Janna left home, at the same time, but went opposite directions. If Joe is driving at 55 miles per hour, and Janna is driving at 40 miles per hour, in how many hours will they be 570 miles apart?



Question set [65 - 67]

Maria can type 240 words in 4 min.

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65. What is her typing rate in terms of words per min?
66. What is her rate in terms of words per hour?
67. What is her rate in terms of words per second?
68. The number A4321 is divisible by 9. Find the digit A.
A) 2
B) 4
C) 6
D) 8
69. Two hamburgers and two colas cost \$4.20. Two orders of french fries and two colas cost \$2.64. If one hamburger, one order of french fries and one cola cost \$2.65, what is the cost of one cola?
70. You've heard that the coldest temperature ever recorded has been -90° Celsius at the Soviet installation in Antarctica a few years ago. What is the temperature in degrees Fahrenheit?
[Hint: $C = \frac{5}{9}(F - 32)$]
71. A stairway has less than 50 steps. If Tony goes up 2 steps at a time, then one step is left at the end. If he goes up 3 steps at a time then 2 steps are left. If he goes up 5 steps at a time then 4 steps are left. How many steps at most are there?
72. Doris spent $\frac{2}{3}$ of her savings on a used car, and she spent $\frac{1}{4}$ of her remaining savings on vintage fuzzy dice. If the dice cost her \$250, how much did her original savings total?
73. How many 2-digit integers have 10 as the sum of their digits?
A) 10
B) 9
C) 8
D) 7

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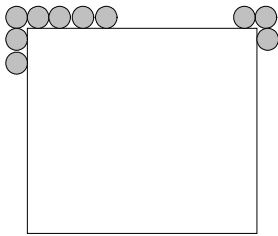
74. How much paper is needed to entirely cover a $3 \times 4 \times 5$ box?
- A) about 105
 - B) about 95
 - C) about 85
 - D) about 75

77. The numbers 1, 5, 8, 9, 10, 12, and 15 are divided into one or more numbers. The sum of each group is the same. What is the largest possible number of groups?
- A) 1
 - B) 2
 - C) 3
 - D) 4

75. It was reported that a flu epidemic is affecting 6 out of every 15 college students in a certain part of the country. At this rate, how many students will be affected at a university of 15,000 students?

78. Anne, Betty, and Cynthia are talking about how much money they have. Anne and Betty have a sum of \$12. Betty and Cynthia have a sum of \$18. Anne and Cynthia have a sum of \$10. Who had the least amount of money, and how much was it?

76. Posts of equal diameter are used to make a square fortress. There are 19 masts needed each side. How many masts are needed for the fortress?

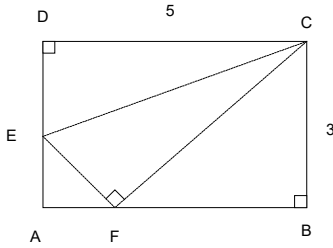


79. Twelve people go on a camping trip with enough supplies to last ten days. If three more people join them without buying supplies, how long will the supplies last if the original daily share for each person is not changed?

80. Two pencils and three pens cost 78 cents. But three pencils and two pens cost 72 cents. How much does one pencil cost?

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81. On a piece of paper, ABCD is a rectangle. By folding along CE, D will land on F. Find the length of DE.



85. Find an equation (in standard form) of the line containing $(5, 3)$ and perpendicular to the line $5x - 3y = 4$.

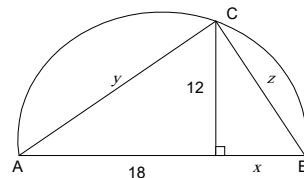
82. Train A and Train B are running on parallel rails. Train A is 400 feet long and Train B is 200 feet long. If they're going the opposite direction, they pass each other in 5 seconds. If they're heading the same direction, the faster train takes 15 seconds to pass the slower train.

86. A student earned 25 cents for every passed test, and lost 50 cents for every failed test. If the student passed 7 times as many tests as he had failed, and received \$3.75, how many tests did he fail?

83. Julius Caesar wrote the Roman Numerals I, II, III, IV, and V in a certain order from left to right. He wrote I before III but after IV. He wrote II after IV but before I. He wrote V after II but before III. If V was not the third numeral, in what order did Caesar write the five numerals from left to right?

87. Each member of the XYZ club contributed the same amount of money with 3 coins. If a total of \$1.21 was collected, how many nickels were contributed?

88. $\triangle ABC$ is a right triangle inscribed in a semicircle. Find the value of x , y , z , and the area of the semicircle.



84. Find an equation of the line containing $(5, 3)$ and parallel to the line $5x - 3y = 4$.

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89. Tom multiplied a number by $2\frac{1}{2}$ and got 50 as an answer. However, he should have divided the number by $2\frac{1}{2}$ to get the correct answer. What is the correct answer?
90. Michelle rode her bike at 14 miles per hour and Karen rode her bike at 15 miles per hour. If Karen rode her bike 10 miles more and 30 minutes longer than Michelle, how long were they each on their bikes?