

Winter Math Contest: Zebra 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)

– 1 –

Show your work for each question to receive credit.
Circle your answer to be graded.

Zebra

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1. If the ratio of the fans (for a baseball team) to non-fans in a group is 4 to 3, what fraction of the people in the group are non-fans?
2. A food truck sold 45 servings, which were $\frac{3}{5}$ of its stock, how many servings were left over?
3. Julie prepared a number of dishes for a party. There were 4 dishes for special diets, $\frac{2}{7}$ of all the dishes. How many dishes are non-diet?
4. There are twice as many boys as there are girls in Mrs. Miller's class. If there are a total of 36 students in the class, how many boys are there?
5. If they agree to share the cost evenly, how much money should each brother contribute?
6. If Sam wants to pay twice as much as Tim, how much should Sam contribute?
7. Josh and Gary decided to buy a \$120 remote control car together. On every \$5 of cost, Josh pays \$3, while Gary pays \$2. Following this rule, how much should Josh share the cost?
8. Kate has 10 red and 10 white gold fish. How many white goldfish at most can she put in the tank at most, so that the chance of getting a white goldfish is $\frac{3}{4}$?



Question set [5 - 6]

Sam and Tim want to buy a \$180 video game machine.

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Show your work for each question to receive credit.
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9. Each box has 3 alligators and 5 crocodogs. If there are 64 creature toys, how many crocodogs were made?
13. How many cups of lemonade can you make with 10 cups of lime juice?

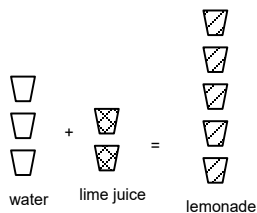
Question set [10 - 13]

A lemonade recipe requires 3 cups of water with 2 cups of lime juice. A cup sells for 50¢.

10. According to the recipe, how many cups of lime juice are needed to mix with 30 cups of water?

11. How many cups of lemonade can be prepared with 2 cups of lime juice?

12. How many cups of water are needed to mix with 10 cups of lime juice?



14. The sum of the ages of Michael and Nelson is 36. Michael is half Nelson's age. How old is Michael?

15. Alex is one third of Brian's age. If they total 52 years old, how old is Brian?

16. The first and second places on a license plate can be any letters from A to Z. The third and fourth places can be any digit from 0 to 9. For example, DO97 is a good choice. How many different legitimate license plates are there?

17. Carlie's car can run 35 miles per gallon. She drove her car in a 210-mile trip.
- (a) How many gallons of gas did she use?
- (b) How much money did she spend on gas if each gallon costs \$2.00?

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18. $\frac{1}{8}$ mile is _____ yards.
(Note: 1 yard = 3 feet. 1 mile = 5280 feet)
19. Two apples and three oranges cost \$3.70.
If three apples cost \$2.40, how much does an orange cost?
20. A parking lot charges \$8 for the first hour, and \$4 for each additional hour. How many hours can you park with \$20?
21. Each notebook is sold for $3\frac{3}{4}$ dollars. How much does it cost to purchase 4 of them?
22. Don earned $6\frac{3}{8}$ dollars for each hour of his work. If he works 8 hours a day and 5 days a week, how much money does he make in 4 weeks?
23. It costs \$24 per hour to hire a painter. How much would it cost for a painting job which takes 15 hours and 45 minutes?
24. After spending $\frac{1}{3}$ of her money, Donna has \$6 left. How much money did she spend?

Question set [21 - 23]

Quick fraction technique. Keep in mind the following trick using distribution.

$$\star 4 \times 3\frac{1}{2} = 4 \times 3 + 4 \times \frac{1}{2} = 12 + 2 = 14$$

$$\star 5\frac{1}{4} \times 8 = 5 \times 8 + \frac{1}{4} \times 8 = 40 + 2 = 42$$

25. The price of a teddy bear is tagged \$30. On a Christmas sale, it is $\frac{1}{3}$ off the tagged price. What is the sale price?
26. Luke spent \$65 on his credit card. If he paid only $\frac{2}{5}$ of the total amount due, how much will leave in balance?

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27. Alex has \$60. Bryan has twice as much as Alex, and Charlie has one-third of the amount of Bryan. How much does Charlie have?
28. A pump can fill a tank of 15 gallons of gas in 3 minutes. How long does it take to fill a 24-gallon tank?
29. How many ounces does he need for the dinner?
30. How many quarts does he need?
(Hint: 1 quart = 32 oz)
31. Before her vacation trip, Mrs. Gannon bought 5 gallons of gas at \$1.18 per gallon. How much did she pay in all?
32. If candy canes cost \$1.60 a dozen, how much would it cost to buy candy canes for a school with 420 students?
33. David has \$2,500 for his budget this week. He used $\frac{1}{10}$ of his budget on repair work, $\frac{1}{5}$ on food, and $\frac{1}{2}$ on wages. What fraction of his budget does he have left?

Question set [29 - 30]

Ray is mixing punch for Thanksgiving dinner. He wants to give each of the 48 guests a 6-oz serving.

29. How many ounces does he need for the dinner?

30. How many quarts does he need?
(Hint: 1 quart = 32 oz)

31. Before her vacation trip, Mrs. Gannon bought 5 gallons of gas at \$1.18 per gallon. How much did she pay in all?

34. The seating capacity at the football stadium is 56,600. During the last game, the stadium had 42,000 people who paid in cash, and an additional third of that number used free tickets. How many seats were empty?

35. Rockvillage has a population of 3,000. It spends \$2,400 for a project on air pollution control. How much does this project cost per person?

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36. Jesse made a book cover for creative writing from green cardboard. The cover is $12\frac{1}{2}$ inches long and 8 inches wide. What is the area of the book cover (front and back) in square inches?
37. Xenia weighs 120 pounds now. She plans to lose $\frac{1}{4}$ of her total weight. What will she weigh if she carries out?
38. Tammy's class has a dress-up day. There are 81 students in the class, and she notices that 2 out of 9 students are not dress up. How many students are dressed up?
39. A store sells a type of tasty candy in two different pack sizes, one with 20 pieces, the other one with 40 pieces. They are sold at \$10 and \$12, respectively. Which one is a better buy?
A) 20-piece
B) 40-piece
C) both the same
40. Tonya weighed 45 pounds last July. She gained $\frac{1}{3}$ of her weight in one year. What is her weight now?
41. A retailer 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 the blouses?
42. $\frac{3}{8}$ of the class was absent for a flu. There were 15 students present. How many students did the class have?
43. What number belongs in the \square to make the equation below true?
 $2^2 \times 3^2 \times \square = 90$
44. The surface area of a cube is 96 ft^2 . What is its volume?

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45. What value of k makes the following equation true?

$$k \div 3 = 36$$

50. List all the outcomes that have no head.

Question set [46 - 47]

There are 12 boys, who are 30% of the whole class.

46. How many students are there in the class?

47. How many girls are in the class?

Question set [48 - 50]

One coin is tossed, another coin is then tossed.

48. List all possible outcomes.

49. List all the outcomes that have at least a head.

51. Jennifer got twice as many points on the math test as David, who got twice as many as Josh. Together three of them got 280 points. How many points did Jennifer get?

52. What is the average speed, in miles per hour, of a plane that covers 120 miles in 1 hour and 20 minutes?

53. A blueprint is scaled so that 1 inch represents 6 feet. Find the dimensions of a rectangular room that measures $2\frac{1}{2}$ inches by $3\frac{1}{3}$ inches on the blueprint.

Question set [54 - 55]

A car travels at a speed of 45 miles per hour.

54. How many miles can it travel from 9:05 A.M. to 10:45 A.M.

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55. How many feet can it travel in 1 min?
(Hint: 1 mile = 5280 ft)

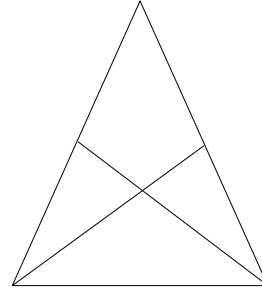
59. The year **1961** has the rare property of reading the same when the paper is turned upside down, namely rotated 180° . Only **0, 1, 6, 8** and **9** form digits upside down. When is the next year after **1961** that has this property?

56. If a car can travel 50 miles on $3\frac{1}{3}$ gallons of gas, how much gas is needed for a 450-mile trip?

60. Find the value for the \square :
 $2^4 \times 4^{10} = 8^\square$

57. If a boat traveled 28 miles in 6 hours, how far can it travel in 9 hours at the same rate?

61. How many triangles are in the figure at the figure below?



58. Samuel stopped his limo for gas when the gas gauge indicated the tank was $\frac{1}{4}$ full. After putting \$5 worth of gas, the tank was $\frac{3}{8}$ full. Gas costs \$1.25 per gallon. How many gallons can the tank hold when full?

62. Why can't a person's hand be 12 inches wide?

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63. The property tax on a summer home valued \$75,000 is \$1,500. Find the tax rate in percent.

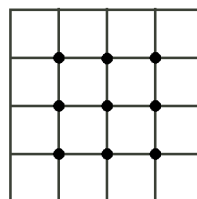
64. The man is 6 ft tall and has a 2-ft shadow. The Easter Island statue has a 14 ft shadow. Find the height of the statue.

65. 24 can be prime factorized as $2^3 \times 3$ in exponential form. Prime factorize 648 in exponential form.

66. John runs $\frac{1}{4}$ of a mile in 12 minutes. What is his speed in miles per hour?

67. The nine interior intersection points on a 4 by 4 grid of squares are shown. How many interior intersection points are there on a 12 by 12 grid of squares?

- A) 100
- B) 121
- C) 132
- D) 144
- E) 169



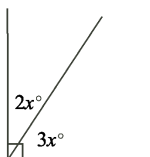
68. Garden seeds are on sale at 50¢ for 3 packets. How many packets at most can you purchase with \$15.00?

69. Which of the points positioned on the number line best represents the value of $\sqrt{3}$ - T?
A) P
B) Q
C) R
D) T
E) U

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70. Marl borrowed \$200 at 12% simple interest for one year. If he makes no payments that year, how much interest will he owe at the end of the year?

71. The figure below is a right angle. Find the value of x .

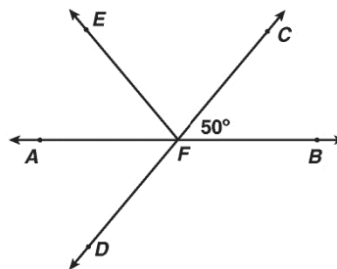


72. A certain map uses a scale of 1 inch equals 25 miles. How many miles are represented by 5 inches on this map?

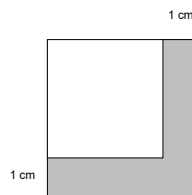
73. Martin started the day with $38\frac{1}{9}$ pounds of beans. He sold all but $31\frac{1}{7}$ pounds. How many pounds did he sell?

74. How far (in miles) can a car go in an hour and 20 minutes at a speed of 30 miles per hour?

75. In the figure below, CD intersects AB at F , $\angle CFB = 50^\circ$, and $\angle EFA = \angle AFD$. What is $\angle EFC$?



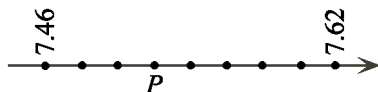
76. If an edge of a square is increased by 1 cm, then its area is increased by 11 cm^2 , as shown by the shaded region in the figure below. What is the area of the original square (the unshaded region)?



77. $\frac{4}{5} \div \frac{8}{7} \div \frac{3}{2} =$

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78. In the diagram, the points are equally spaced on the number line. What number is represented by point P?



- A) 7.48
 B) 7.49
 C) 7.50
 D) 7.52

79. Both Ann and Ben are reading the same book "Treasure Island." Ann can read 5 pages in 30 minutes. Ben spends 20 minutes to finish 4 pages. Who is reading faster?

- A) Ann
 B) Ben
 C) Both the same

80. Express $\frac{3.6}{4.8}$ as percent.

81. Roberto is making 36 caramel apples for his sister's class.

CARMEL NEEDED FOR
 CARMEL APPLES

Number of Carmel Apples	Pounds of Carmel
4	1
8	2
12	3
16	4
20	5

Using the table above as a guide, how many pounds of caramel will Roberto need to make 36 caramel apples?

82. 6 twos + 8 threes = 2 sixes + ? eights

- A) 3
 B) 6
 C) 8
 D) 12

83. An 800-meter long train traveling at 20 meters per second went into a tunnel. The rear of the train emerged from the tunnel 90 seconds after the front of the train entered the tunnel. Find the length of the tunnel, in meters.

84. Find the seventh term in the following sequence: 0, 2, 5, 9, 14, ...

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85. How many whole numbers are there rounded to 12300 in the nearest hundred?

88. Of the following, which is largest?

A) $\sqrt{\frac{1}{2}}$

B) $\sqrt{\frac{1}{4}}$

C) $\frac{1}{4}$

D) $(\frac{1}{2})^3$

Question set [86 - 87]

In the first quarter of last Fridays basketball game, Katie and Sarah scored all the points for their team.

86. Sarah shot $\frac{1}{4}$ of all the points. Katie shot 12 points. How many points did the Gold team score?

89. Suppose that you have a number of cards (more than 31). If you put the cards in groups of five, none are left over, but if you put the cards in groups of eleven, then nine are left over. What is the smallest number of cards that you can possibly have?

87. In the second quarter of the game, Katie scored a fifth of the teams 20 points while again Sarah scored the rest. How many points did Sarah score?

90. What is the reciprocal of $(1 + \frac{7}{8})$?

A) $\frac{8}{15}$

B) $1 + \frac{8}{7}$

C) $\frac{15}{8}$

D) $\frac{7}{15}$