Math Bowl (7)

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60 minutes, 50 questions

Rules

This test contains 50 questions for you to complete. You have 60 minutes to complete as many problems as you can, but you are not necessarily expected to complete them all. Points are awarded for each correct answer, and no points are docked for incorrect answers.

Answers are free response and must be as simplified as possible. Units are ***NOT*** *necessary. All answers are integers, unless the problem specifies otherwise (ex. common fraction, decimal, simplest radical form).*

Please write all answers onto the ***answer sheet****. You may write directly on this test – however* ***only answers written onto the answer sheet will be graded****. Please write as neatly as possible on the given blanks on the answer sheet. If graders are unable to read the answers, you will not receive credit.*

Name _____

School _____ Grade _____

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1. What is 13.57% of 10000?

2. Adam runs a mile every day for four days. On the first three days, he runs a 6:09, 6:13, and 5:52. What is the slowest mile he can run on the fourth day to get an average time of exactly 6 minutes?

3. Alan and Brian are siblings, with Alan older than Brian. The sum of their ages is 34. The difference of their ages is 4. In 2 years, how old will Brian be?

4. Find the largest odd factor of 2017.

5. In a right triangle, two of the sides measure 88 and 105. Find the length of the other side.

6. How many ways can you pick a 5 person committee from a group of ten people?

7. How many three digit palindromes are there?

8. Write 2017 in roman numerals.

9. In a right triangle, the hypotenuse measures 85 and one leg measures 51. What is the length of the other leg?

10. What is the equation of the line containing the points (-1,2) and (3,3)?

11. A car travels at a constant speed of 36 mph. If the car travelled 21 miles, how many hours was it travelling for? Express your answer as a fraction in simplest form.

12. If Dyrus can kill one scuttle crab in 17 seconds, how many seconds does it take him to kill 17 scuttle crabs?

13. x percent of x is 9. What is x?

14. Angle A and Angle B are complementary. If Angle A measures 89 degrees, what does Angle B measure.

15. The price of Bob's house is currently 157% of what it was 5 years ago. If his house is worth $208,182 right now, how much was it worth 5 years ago?

16. What is the smallest possible value of x^2 if $-16 \leq x \leq 20$?

17. What is the sum of the positive integers from 1 to 500?

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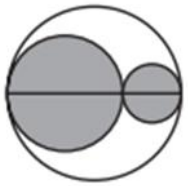
18. If x% of 45 is 55, what is x% of 63?

19. Alan is playing League of Legends instead of writing problems. If he plays 8 games and each game is 45 minutes long, how many hours of his life has he wasted?

20. In the diagram (drawn to scale), there are 3 circles. The ratio of the radii is 3:2:1. Find the ratio of the area of the unshaded region to the area of the shaded region.



21. If you flip a fair coin and roll a fair four-sided die, what is the probability that you get a heads and an even number?

22. Let $\otimes \quad \otimes \quad = \quad + \quad +$ .Find $1 \otimes 2 \otimes 3$.

23. Diane's house is 30 miles from her school. Every day, she bikes to school at a constant rate of 15 mph. One day, Diane was biking to school from her house. When she got halfway, she realized she forgot her homework at home. She immediately turned back to get her homework and then biked back to school. How many hours did it take Diane to get to school that day?

24. What is $\sqrt{10} * \sqrt{30} * \sqrt{50} * \sqrt{90}$?Express your answer in simplest terms.

25. Orrin really enjoys playing piano. He plays for 2 hours a day, every day, for twelve years. He frequently goes to piano competitions, often winning them. How many hours a week does he play piano?

26. What is the sum of two internal angles of a regular octagon?

27. Glen has a bag of 10 oranges. 3 of those 10 oranges are bad and the rest are good. If Glen selects two oranges without replacement, what is the probability that he picks 2 bad oranges?

28. Find the sum of the roots of the equation $^{12} + \ ^{6} + 5 \ ^{2} + 10 \ + 2016 = 0.$

29. What is 10% of 20% of 30% of 40% of 50% of 60% of 70% of 80% of 90% of 100000000?

30. Sarah has 20 different pieces of candy. How many ways can she select two of them to eat?

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31. At Sam's Sandwich Shop, a meal consists of three parts: the sandwich, the side, and the drink. If there are 5 options for the sandwich, 6 options for the side, and 10 options for the drink, how many unique meals can be made if all three parts are used?

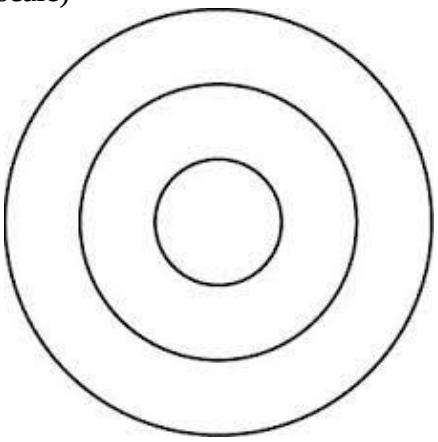
32. Given a and b are positive integers, what is a+b if $^{2} + 2 \quad + \quad ^{2}$ is 64?

33. Given a and b are positive real integers, what is a-b if $3 \quad ^{2} - \quad ^{3} + \quad ^{3} - 3 \quad ^{2} = 216$?

34. What is x if 4199x+323=4845? Express your answer as a fraction in simplest form.

35. Andrew is thinking of a number. The square of his number minus ten times his number plus 25 is 2601. What is his number?

36. There is a dartboard consisting of 3 concentric circles of radius 5, 4, and 3 inches. What is the probability a randomly thrown dart lands in the middle ring? (Diagram NOT to scale)



37. What is the largest 3 digit number you can get from the product of 2 prime numbers?

38. How many numbers less than 100 are prime?

39. Alice and Bob are house painters. Alice takes 10 hours to paint a house alone. Bob takes 20 hours to paint a house alone. How long does it take for them, working together, to paint a house? Express your answer in minutes.

40. The 100 students at a camp can either dance, sing, or do both. If 37 people cannot sing, and 58 people cannot dance, how many students can both sing and dance?

41. What are the coordinates of the center of a circle with equation $(\quad - 1)^2 + (\quad - 5)^2 = 29$?

42. How many numbers less than 20 are relatively prime to 20?

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43. What is the measure, in radians, of the smaller angle formed between the hands of a clock at 9:20?

44. What is the tens digit for 7^{2017}.

45. On a strange planet, 5 boos are equal to 6 blahs, 9 blahs are equal to 4 yaddas, and 3 yaddas are equal to 5 yoos. How many boos are equal to 120 yoos?

46. There is a 3 by 4 grid. How many paths are there from the bottom left corner to the top right corner if the only steps are up or to the right?

47. Joe is making plans for his new rectangular garden. He knows that he has 42 meters of fence that he will use as the border of garden. If each side of his garden has an integer side length in meters, what is the largest area (in square meters) that he can enclose with the amount of fencing that he has?

48. If an equilateral triangle has side length $2\sqrt{3}$, what is its area?

49. If $( ) = {}^{3} + 3 {}^{2} + 3 + 2$, what is (3)?

50. What is the greatest common divisor of 3990, 2730, and 1050?

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Answers

1. 1357
2. 5:46
3. 17
4. 63
5. $\sqrt{88^2 + 105^2} = 137$ $\sqrt{105^2 - 88^2} = 57.28$
6. 252
7. 90
8. MMXVII
9. 68
10. $y=\frac{1}{4}x+\frac{9}{4}$
11. $\frac{7}{12}$
12. 289
13. 30
14. 1
15. 132600
16. 0
17. 125250
18. 77
19. 6
20. ⅘
21. ¼
22. 12
23. 4 hours
24. $300\sqrt{15}$
25. 14
26. 270
27. $\frac{1}{15}$
28. 0
29. 36288
30. 190
31. 300
32. 8
33. 6
34. $\frac{14}{13}$
35. 56
36. $\frac{7}{25}$
37. 899
38. 25
39. 400 minutes
40. 5
41. (1,5)
42. 8
43. $\frac{8}{9}$ radians
44. 0
45. 135 boos.
46. 35
47. 110
48. $3\sqrt{3}$
49. 65
50. 210