

**MathEdge
Contest
2016**

First Name _____
Last Name _____
Grade _____, School _____
City _____

**Advanced
6-7-8**

2016 MathEdge+ Int and Adv Contest

4th & 5th graders do problems 1-20; 6th, 7th & 8th Grader do problems 1-25.

Time allowed: 45 mins.

Please box the answer. Only correct answer counts.

No calculator is allowed. The higher # (harder) problems will be used for tiebreak.

Problem 1-5 is worth 1 point each.

Problem 6-10, 2 points each.

Problem 11-15, 3 points each.

Problem 16-20, 4 points each.

Problem 21-25, 5 points each.

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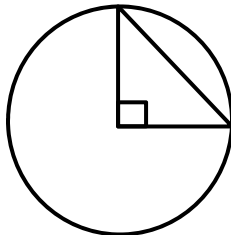
5. Kevin can buy 6 candies for 90 cents. If he wants to buy 10 candies, how much should he pay?

6. In the list of the numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, how many of them are exactly 3 larger than some of the others and exactly 5 smaller than some of the others?

7. $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} = ?$

8. Ron went to a shopping center during the weekend with a certain amount of money. He spent $\frac{1}{3}$ of his money in store A. Then he spent $\frac{1}{3}$ of his money he had left in store B. Again, he spent his remaining \$12 in store C. How many dollars did he have at the start?

9. If the area of the right triangle shown is 32 cm^2 , what is the area of the circle in term of π ?



10. The sum of two whole numbers (one being the smallest prime number) is 205. What is the product of the two numbers?
11. What is the remainder of $(1^1 + 2^2 + 3^3 + 4^4 + 5^5 + 6^6 + 7^7 + 8^8 + 9^9) \div 3$?

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12. Rohan and Mei work on a school project to paint a wall outside their classroom. After working for three hours, James joined them and took one more hour to finish. If James did not join, Rohan and Mei would need three more hours to finish. If James painted the wall by himself, how many hours will he need to finish the work?

13. What is the least number of identical cubes that can be placed into the rectangular container with dimensions of 325 cm, 175 cm, and 75 cm so that there is no space left over?

14. John has six different pairs of socks in his laundry basket. What is the probability that he will pick two matching pairs without looking? Express your answer as a common fraction.

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15. How many 3-digit numbers can you make with the digits 0, 1, 2, 3, and 4?

16. There were 618 students in a middle school that went to Summer Camp. There are 10% more 7th graders than there are 6th graders, and there are 10% less 8th graders than there are 7th graders. How many students in each grade went to the summer Camp?

17. What is the unit digit of $3^{100} - 1$?

18. How many counting numbers less than 100 are divisible by 2, 3 and 4?

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19. If n is an integer and $30 < 2^n < 500$, what is the sum of all of the possible values of n ?

20. What is the least positive number with exactly 10 factors?

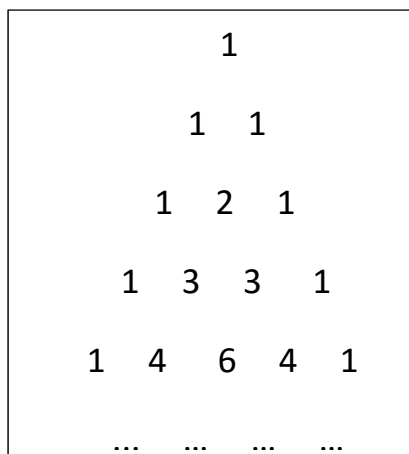
21. A 5×10 rectangle is rolled to form two different cylinders with different maximum volumes. What is the ratio of the smaller to the larger volume? Express your answer as a fraction.

22. What is the maximum number of $2'' \times 3''$ rectangles that will fit within a $15'' \times 15''$ square without overlapping?

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23. A right pyramid has a square base of side length 10 cm. Its peak is 12 cm above the center of its base. What is the surface area of the pyramid?

24. The figure below is called a Pascal Triangle:



In each row, the starting and the ending numbers are always 1s, and the quantity of numbers increases by 1 in each consecutive row. Starting from the third row, the value of each number(s) between the first and the last can be obtained by summing the two numbers right above it. What is the sum of all the numbers from the first to the tenth row?

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25. How many ways can you pay a bill of \$100, assuming that you have sufficient amount of five-dollar, ten-dollar, and twenty-dollar bills to pay in any way?