

The 1st Annual West Windsor-Plainsboro Mathematics Expo

Saturday, October 26th, 2019

Grade 4 Problem Set

Directions:

Solve the following problems to the best of your ability. If you do not understand a problem or cannot solve it, skip it or ask for a hint. If you cannot solve a problem even after receiving all the hints for that problem, wait until the 30 minute mark and ask a proctor for further help or the solution. Some problems may not have hints.

Calculators are not allowed for these problems. You may, however, discuss with the people around you after 30 minutes have passed. That being said, do not ruin a problem for somebody by giving them a solution before they have a chance to attempt the problem themselves.

For this test, there will be 20 questions, and you will have a time limit of 60 minutes in total, which will be split into 30 minutes of individual work and 30 minutes of collaborative work. This test is very long and you are not expected to be able to do all of the problems. We recommend picking a range of 10-15 problems to work on.

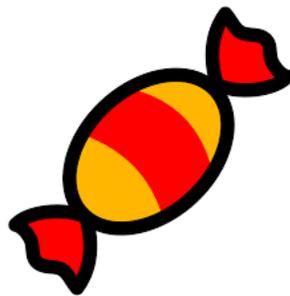
Please note that this is not a competition, and your goal is to enjoy the problems and gain experience.

HAVE FUN!

1. What is $1 \cdot 1 + 2 \cdot 2$?
2. The problem writer for this test was born on January 25th 2004. How old is he now (October 2019)?
3. What is $2/10 + 4/100 + 6/1000$, expressed as a decimal?
4. Suraj likes to play basketball. If he makes 10 shots worth 2 points and 15 shots worth 3 points, how many total points does he score?



5. If $2x = 3x = 4x$, what is the value of x ?
6. Henry has 300 pieces of candy. 243 of them are Kit-Kats. How many pieces of candy does Henry have that are not Kit-Kats?



7. Ansh is 6 feet 1 inch tall. If there are 12 inches in a foot, how tall is he in inches?
8. Allen has 20 dollars to spend at the bake sale. He wants to buy 4 brownies worth 2 dollars, 9 pieces of candy worth 1 dollar, and 2 key chains worth 50 cents. If Suraj steals 5 dollars from Allen, will he have enough to buy everything he wants?

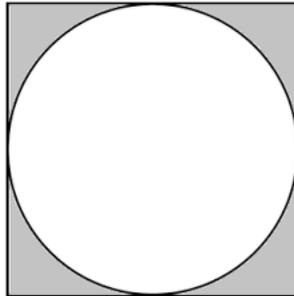


9. If $a = -4$, what is the largest number in the set $4a$, $16/a$, $a+7$ and $-5/(a*a)$?

10. Brian the Bear has 4 sisters and 6 brothers. His sister Barbie has S sisters and B brothers. What is the product of S and B?
11. The 10-letter code MATH IS LUCK represents ten digits 0-9, in order. What 4-digit number is represented by the code word HATS?
12. Express $1/32$ as a decimal.
13. What is the remainder when 123456789 is divided by 11?
14. A rectangle has an area of 25 square centimeters. If the length is 1 meter, what is the width in meters?



15. What is $2(1-1/2)+3(1-1/3)+4(1-1/4)+ \dots +20(1-1/20)$?
16. If $n! = n \cdot (n - 1) \cdot (n - 2) \cdot (n - 3) \cdot \dots \cdot (3) \cdot (2) \cdot (1)$, what is $9!/(5! \cdot 4!)$? For example, $4! = 4 \cdot 3 \cdot 2 = 24$. This notation is referred to as a factorial, and $4!$ is pronounced "four factorial."
17. Boris takes a two digit number, subtracts it from 300, and triples the result. What is the largest number he can get?
18. What is the area of the smallest square that will inscribe a circle of radius 3?



19. Let $f(x)$ be a function that is linear, and satisfies $f(0) = -4$ and $f(3) = 2$. Find $f(f(6))$.
20. Evaluate the following expression: $\sqrt{20 + \sqrt{20 + \sqrt{20 + \dots}}} + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}} + \sqrt{42 + \sqrt{42 + \sqrt{42 + \dots}}}$