

Calculusolve 2021: 5th and 6th Grade

1. (Group Problem) A basketball single elimination tournament has 126 teams to start. Two of the teams will get a first round bye so they will not play until the second round. Otherwise, each round will pair up all of the teams (those without a bye) for games and the losing teams will be eliminated. How many games must be played in total until there is only a single team left which will be crowned the winner of the tournament?

2. What is the correct value of  $\frac{4^2}{2^3} + (3 \times 2^4 - 12 \div 6) - (10 \div 2 \times 5^2)$

Hint: Carefully follow the order of operations.

3. Billy has four shirts, four pairs of pants and four hats. For each type of clothing he has a black, a red, a blue and a yellow version. How many shirt/pants/hats combinations can Billy wear with at least one of the items in the combination being a different color from the other two?

Hint: How many combinations would have all of the same color items?

4. Both of the hands of a clock correctly point to 12 at noon. Unfortunately, the clock is broken and its operates 3 times faster than it should. How much actual time will pass before the hands point to the correct time again?(Disregard am vs pm)

Hint: Make a table to compare actual time to what the clock would say

5. Assume a line segment is one inch long. Make an equilateral triangle with each side length equal to twice the length of the line segment. Next, make a regular hexagon with each side length equal to the perimeter of the triangle. Finally make a square with each side length equal to half of the perimeter of the hexagon. What is the area of the square?

Hint: Perimeter is just the sum of the side lengths.

6. Tanya's iPhone has 60 minutes of charge left for normal usage. She knows that when she plays Roblox on it the battery drains 3 times faster than normal usage. She proceeds to start a combination of normal usage and playing Roblox and her battery runs out in 44 minutes. How long did she play Roblox?

Hint: Think about what is lost for every minute of Roblox playing.

7. Isaiah wants to get his math test average to be 90%. He has 5 tests all worth 0 to 100 points. On the first four tests, he scored 87, 79, 96 and 94. What is the lowest score he can get on the fifth test in order to reach his goal of a 90% average?

Hint: Think about the total of all the test scores he would need.

8. Grandma's spaghetti sauce recipe can make eight servings and calls for three teaspoons of garlic powder. The proportion of garlic powder to salt should always be three to two (3:2). If we want to make enough of Grandma's sauce for twelve servings then how much salt should we put in?

Hint: Find a way to focus on just the salt.

9. (Group Problem) Joe found a great deal on a car purchase. The original price was reduced for him by 20%. However, he still had to pay a 6% sales tax on the reduced price and an additional \$736 to get the license plate and paperwork done for the car. Joe ended up paying \$16,000 in total to get the car. What was the original price of the car?