

Three out of Five

Here are several problems that all seem to be about “three out of five.” But each problem may need a different method to solve it, and each may have a different answer. Try as many as you can (three out of five might be a good goal). Show your work and explain your thinking!

- **Passwords**

You have to make a password that is three letters long using A, E, I, O, or U. You can use a letter more than once. Possible passwords include: AAE, AEA, or UIE. How many different passwords are possible? How long will it take you to run out of passwords if you have to make a new one every 3 months and cannot reuse a password?

- **Races**

Five children are running in a race. Let's say there will be no ties. In how many different ways can they come in first, second, and third?

- **Books**

You want to borrow five books from the library. The librarian says you're only allowed to borrow three. How many different ways can you choose the three you want to get?

- **Cookies**

There are five trays of cookies at the party, each with a different type of cookie. You want to eat three cookies. How many different ways can you put three cookies on your plate?

- **Dice**

You're rolling five dice. What's the probability that exactly three of them will show the same number? (For example, three twos, or three sixes.) Remember the lessons learned in our last POW. For 6th-8th graders, please do NOT use a calculator in solving this problem.

- **Compare and Contrast**

Once you've solved three or more of the first five problems, take a minute to explain

how each of the problems you worked on is different from the others. Which one was easiest and which was hardest? Have fun exploring these problems.