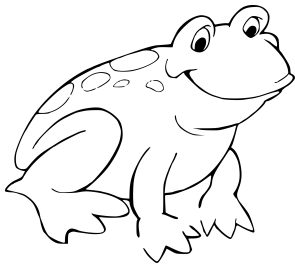


UW Math Circle

Homework

1. Fiona needs two rubber bands for her hair. If she has 5 red rubber bands, 2 blue ones, 4 purple ones and 12 black ones, what is the smallest number of rubber bands she could grab to ensure she has two of the same color?
2. In Shrek's swamp, there are two kinds of animals: leeches and toads. If you ask a leech a question, it will always lie to you, and if you ask a toad, it will always tell the truth. There are four animals living in the swamp named Dan, Donnie, Debbie, and Diana. They made the following statements:
Dan: "Diana and I are different species."
Donnie: "Debbie is a leech."
Debbie: "Donnie is a leech."
Diana: "Of the four of us, at least two are toads."
How many of these animals are leeches, and how many are toads?



3. Dragon has 5 gold pieces, three of which are real. One is fake and lighter than the real gold and the other is fake but heavier than the real gold. How can you determine which gold pieces are fake using only three weighings?

