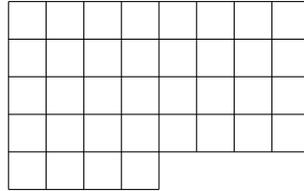


Problem Set IV

1. A prince has a 5×8 foot flying carpet. While visiting the Kingdom of Samhop he was attacked by a fire breathing dragon. A strip of his carpet was burned away as seen in the figure below.



The magic carpet only flies well when it has rectangular shape, so he enlists the help of a princess. She cuts the carpet into 3 rectangular strips and sews them back together to form a 6×6 carpet. How did she cut the magic carpet?

2. Sir Charles and Lady Miranda are from the Island Kingdom of Samhop. One of them is a knave and one is a knight. Sir Charles claims that 2 rubies are more expensive than 3 sapphires. Lady Miranda states that 3 rubies are more expensive than 4 sapphires. What is more expensive: 12 rubies or 18 sapphires?

3. In the Kingdom of Samhop, knights and knaves live in separate villages. However, the villagers often visit their friends in other villages. This week, the Samhop Scroll announced a contest: to come up with a single yes/no question that would allow a tourist to figure out where she is (in a knights' village or in a knaves' village). The question should be addressed to a local person. It is not known in advance whether this local is a knight or a knave and whether he is a resident of this village or not. Henry the Math Math Challenge student won the prize. What was his question?