

Prime Factor Math Circle 2014-2015

Junior Circle 3, Problem Set 8

Back

4	2	3	2
3	3	1	2
2	1	3	1
1	2	1	2

Front

1. Ilaria made a building out of sugar cubes. The table shows a view from the above: the number in each cell shows how many cubes she stacked in that particular spot. When you look at Ilaria's building from the front, what will you see?

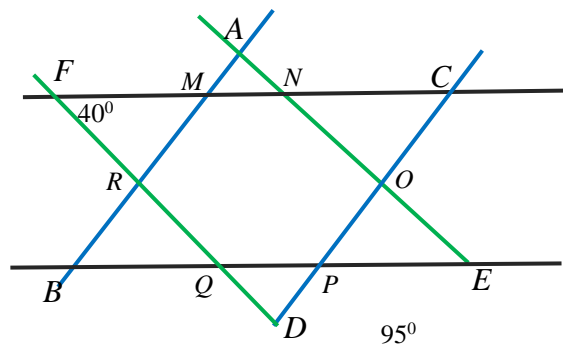
2. What is the measure of an angle formed by the minute and the hour hands of a clock at:

- a) 9 pm;
- b) 11 am;
- c) 5 pm;
- d) 11:30 pm;
- e) 2:15 am.



3. Twenty people are sitting around a table. They all come from an island of Knights and Liars. Each person tells his neighbor on the left that he is a liar, and receives a reply from this neighbor: "You are a liar yourself!" How many knights and how many liars are there at this table?

4. The lines AB and CD are parallel. The lines AE and FD are parallel. The lines FC and BE are parallel. Find the angles of the hexagon $MNOPQR$. (Use the facts that we learned in class about two parallels and a transversal, and about the sum of the angles in a triangle.)



5. Adam rode his bike up the hill with the speed of 12 mph. He then rode the same road downhill with the speed of 20 mph. Adam spent 16 minutes longer going uphill than downhill. How long is the road uphill?



(Hint: think, what is the ratio of the speeds uphill and downhill, and what should be the ratio of the times uphill and downhill?)