

Student Name: _____

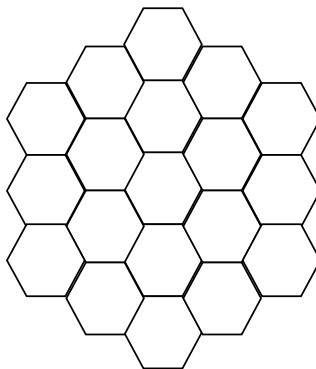
1. A bag contains 5 blue socks and 5 red socks. We remove 1 sock at random, then remove 1 of the remaining 9 socks at random. What is the probability that the two removed socks have the same colour?

Answer: _____

2. A general commands an army of less than 50 people. When he told his troops to line up in rows of 7, 4 people were left over. When he told them to line up in rows of 5, 2 people were left over. How many people were left over when he told them to line up in rows of 9?

Answer: _____

3. If we continue the hexagonal tiling pattern, how many hexagons will be needed to complete another ring around the current hexagons shown in the diagram?



Answer: _____

4. A general does the following routine with his army every day: run for 25 minutes, 2 minute break, run for 23 minutes, 2 minute break, run for 21 minutes, and so on. The routine finishes with a 1 minute run. There is always a 2 minute break between every two runs. Including the breaks, how long does this routine take?

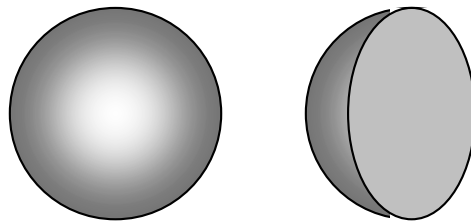
Answer: _____

Student Name: _____

5. A sailor has 3 boats. One night, a flock of pigeons divided themselves on the 3 boats to rest. How many pigeons does there need to be to guarantee that at least one of the boats has 5 or more pigeons in it, no matter how the pigeons divide themselves among the boats?

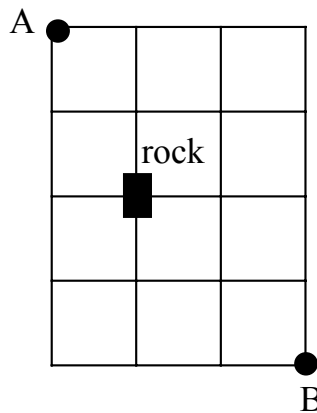
Answer: _____

6. What is the ratio of the surface area of a sphere, to the surface area of half that sphere?



Answer: _____

7. You are trying to travel from point A to point B taking only rightward and downward steps (3 rightward steps and 4 downward steps). However, there is a rock on the map that you can't pass through. How many different paths are there to point B according to these rules?



Answer: _____

8. A number is called abundant if the sum of its factors, excluding itself, is greater than itself. For example, 12 is abundant because $1+2+3+4+6=16 > 12$. How many abundant numbers are there which are less than 25?

Answer: _____