NMSU MATH PROBLEM OF THE WEEK
Solution to Problem 1
Spring 2022

Problem 1.

How many times in 24 hours do the two hands of a clock (hour and minute) form a right angle?

Solution.

Answer: The two hands form a right angle 44 times in 24 hours.

Assume without loss of generality that the 24-hour period starts at 12 o'clock where the two hands are pointing together at 12. After twelve hours, the hands are again pointing together at 12 and during this period they have crossed paths twelve times: one at 12, one between 1 and 2, one between 2 and 3, ..., one between 10 and 11, and again one at 12. We note that in between each pair of consecutive crosses, the hands form a right angle two times. Therefore, in twelve hours they form a right angle 22 times and then the final answer is $2 \times 22 = 44$.