

A painty region is denoted as interval of numbers. For the painty region  $[3, 7]$  paint starts on 3 and continues on every number through (and including) 7. See *Maneuvers on Number Lines* page 11.

1.
  - a. If a +7 cricket starts on -9 write a formula for where he lands on his nth jump.
  - b. Where might a -53 cricket start to land in the painty region  $[377, 381]$ ? Describe all possible starting points.

2.
  - a. Does a +27 cricket, starting at zero, land in any of these painty regions?  
 $[1011, 1038]$                        $[5771, 5766]$                        $[14390, 14392]$
  - b. Give a convincing argument that a +47 cricket will land in the painty region  $[12788, 12834]$  as long as it starts on a number less than 12788.

3. The boxes indicate the numbers a certain positive cricket jumped on. Each box represents one jump. What kind of cricket is it? Fill in the rest of the boxes.

			6				82		
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Try another one:

		-113						19	
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Explain a procedure for doing this kind of problem.

4. If a -37 cricket starts at 1,000,000, after how many jumps will it land in  $[10378, 10418]$ ? Will it land in  $[972, 975]$ ?

5. A +4 cricket starts at 139. At the same time a -6 cricket starts at 1042. If they both jump at the same time every time, will they ever land on the same number at the same time? Draw a picture of the relevant part of the number line showing how the two crickets cross paths.

6. **Challenge:** If a +4 Cricket starts at 3 will it land on any powers of 10? Which ones? If a +3 Cricket starts at 4 will it land on any powers of 10? Which ones?  
 [NOTE: powers of 10 means  $1=10^0, 10=10^1, 100=10^2, 1000=10^3, 10^4, 10^5, \text{etc.}$ ]

7. In Heximal, write out the arithmetic sequence for a +4 cricket, a +11 cricket, -5 cricket. What patterns do you observe? Which of the above crickets will land on 1000? Can you explain why without writing the sequence all the way?

[NOTE: all numbers are written as heximal numerals in this problem. Do the problem pretending you are teaching Hexite children. That is, don't use or mention decimal numerals.]

8. On the Mod 26 Spiral, will a +5 cricket eventually land on every spoke? Will a +6 cricket eventually land in every spoke? Can you determine which crickets, if any, will eventually land in every spoke?

