

Representing numbers (and instructions) in binary

1. Complete the following problems from Harris and Harris: 1.30, 1.34, 1.42, 1.50, 1.52, 1.54, and 6.10
2. One interesting approach to representing signed numbers is to use a negative base. Each digit in the representation of a number using a negative base would be multiplied by the appropriate power of the base. For digits in even number positions, this would yield an even result while digits in odd positions would make a negative contribution. For example 132_{-4} would be interpreted as

$$1 \times (-4)^2 + 3 \times (-4)^1 + 2 \times (-4)^0 = 1 \times 16 + 3 \times (-4) + 2 \times 1 = 16 - 12 + 2 = 6_{10}$$

Please draw a number line as you did for exercise 1.50, but this time do it for 4-bit numbers in base -2.