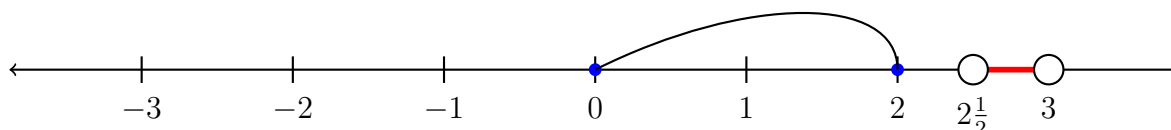
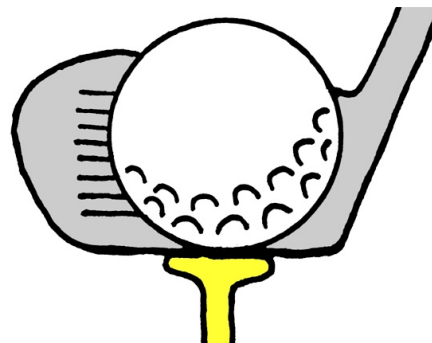
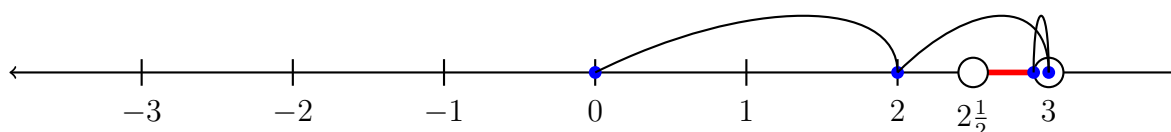


Mixed Number Golf

Mixed number golf is played on the real number line, where the **holes** are intervals of the form (a, b) for some rational numbers a and b . Your **bag of clubs** is a set of positive and negative mixed numbers, which change with each hole. For example, the hole might be $(2\frac{1}{2}, 3)$ and your clubs might be $\{-3\frac{1}{2}, 2, 1\frac{2}{3}, -1, -\frac{7}{8}, \frac{1}{5}\}$. You **tee off** at zero and you take a **stroke** by adding or subtracting one of the mixed numbers in your bag of clubs. So, suppose you're playing the hole $(2\frac{1}{2}, 3)$ with the clubs $\{-3\frac{1}{2}, 2, 1\frac{2}{3}, -1, -\frac{7}{8}, \frac{1}{5}\}$ and you tee off with 2.



Your next stroke will take place at 2, and the goal is to get your number into the hole in the fewest number of strokes possible. If we continued the above game, we might have something like this: first stroke 2, second stroke subtract -1 , third stroke subtract $\frac{1}{5}$,



which gives us $2\frac{4}{5}$ which is in the hole, that is, in the interval $(2\frac{1}{2}, 3)$. Notice that our second stroke put us on the rim of hole (on the end point of the interval), but not actually in the hole. So, the above 3 strokes got us into the hole, but can you see a way to do it in fewer strokes?

- **Hole 1:** $(3\frac{1}{4}, 3\frac{3}{4})$

Clubs: $\{5, -2, 1\frac{3}{4}, 1\frac{1}{8}, -\frac{3}{4}, -\frac{1}{4}\}$

- **Hole 3:** $(-\frac{1}{2}, 0)$

Clubs: $\{5\frac{1}{10}, -4\frac{1}{2}, -3\frac{3}{4}, 2\frac{2}{10}, 1\frac{3}{10}, \frac{7}{10}\}$

- **Hole 2:** $(-1\frac{1}{2}, -1)$

Clubs: $\{3, -2\frac{2}{3}, 1\frac{1}{2}, \frac{7}{8}, -\frac{1}{2}, -\frac{1}{4}\}$

- **Hole 4:** $(1, 1\frac{2}{5})$

Clubs: $\{1, -1\frac{1}{2}, 2\frac{1}{4}, -3\frac{1}{8}, -4, 5\}$