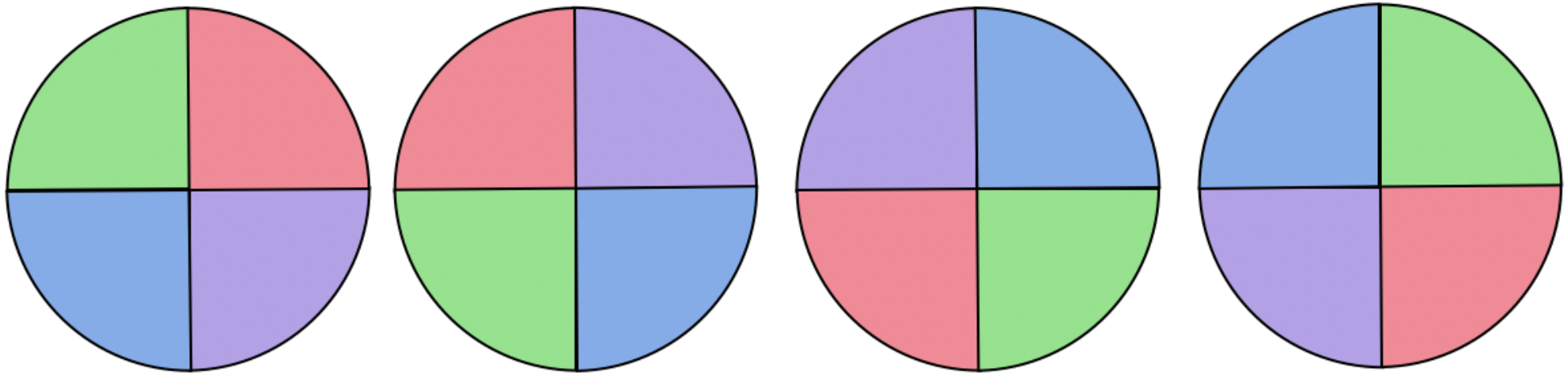
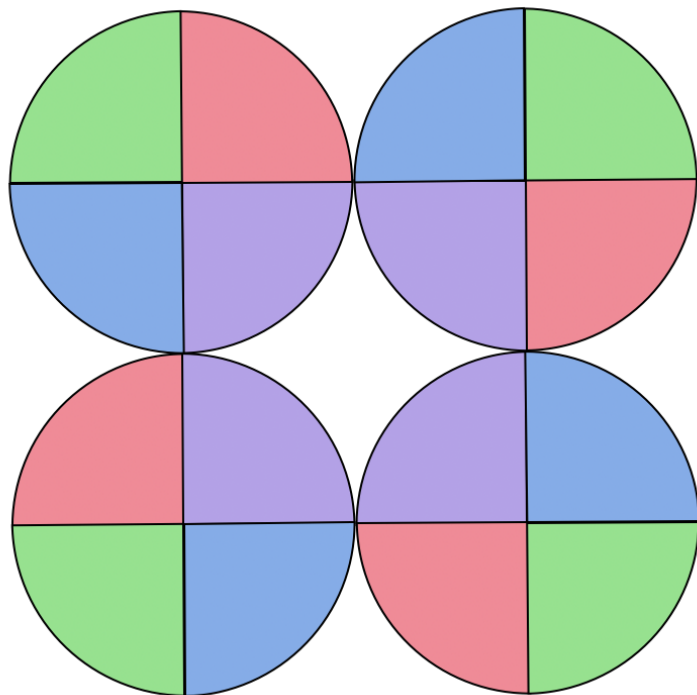


There are some colourful dials each broken up into 4 sections on the bomb.
Each dial is randomized into one of the four orientations below every ten seconds.

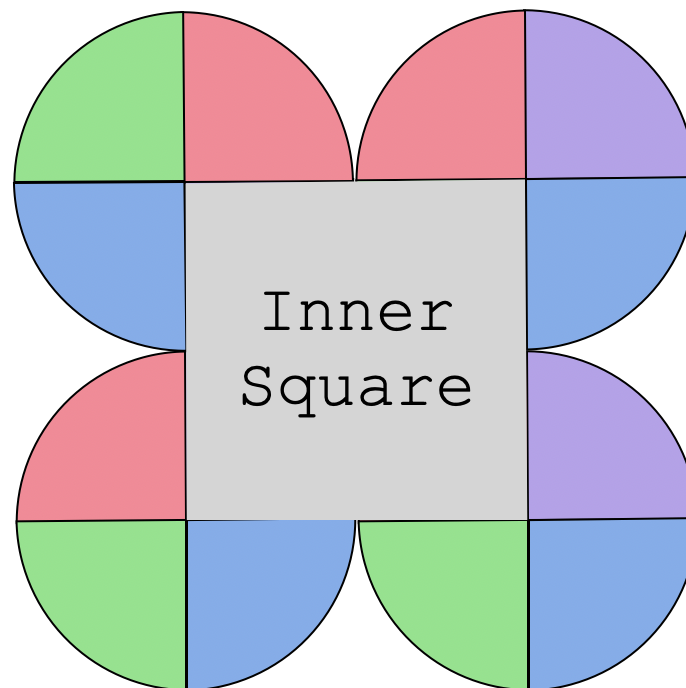


All dials are entirely independent.

The bomb is *primed* when four of the sections on either of the inner squares all share the same colour.



Primed Bomb



Inner Square

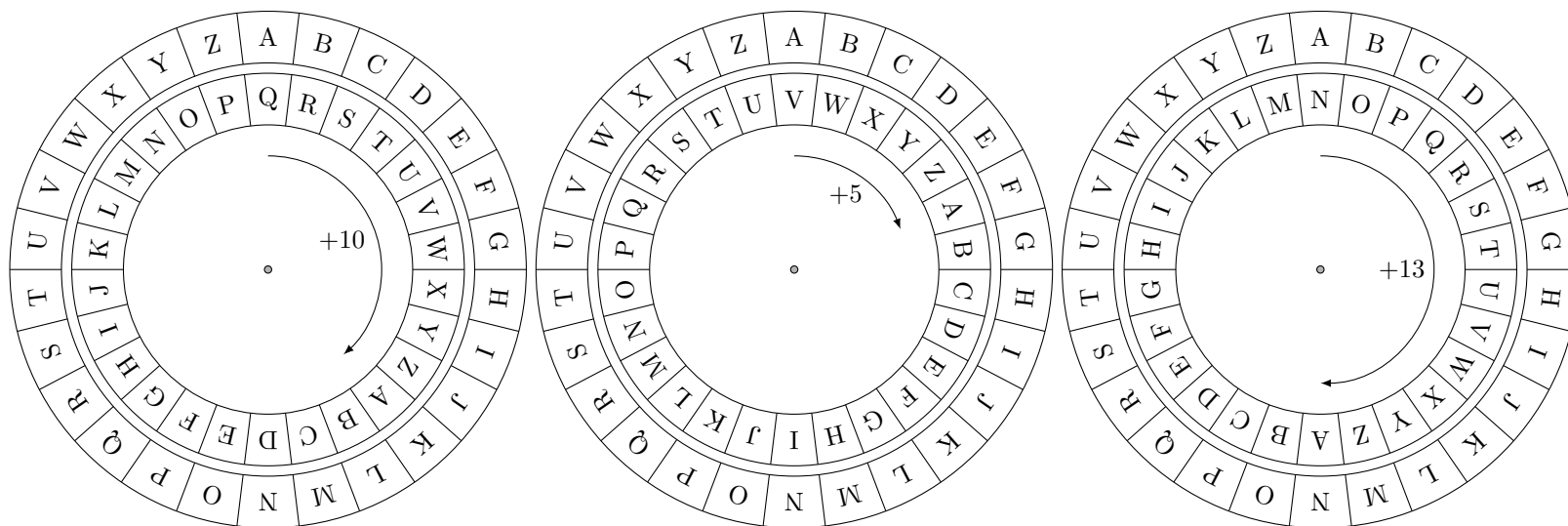
The probability that the bomb is *primed* can be written in lowest terms as $\frac{a}{b^c}$.

There is a blue numeric keypad where three disarm codes must be entered into on the bomb. Rounded to the nearest thousandth, the probability that the bomb is *primed* between 0 and 3 times (exclusive) over a 61 second interval can be written in lowest terms as $\frac{h}{1000}$. The first code is h .

There are some colourful buttons lining the edge of the bomb. For a randomly chosen button $P(\text{Red} \cup \text{Green} | \text{Composite}) = \frac{i}{j}$. The third code is $i + j$.

There is a 5×5 purple grid on the bomb. Each row/column/cage in the grid needs to contain the numbers 1-5 exactly once.

There is a Vigenère cipher on the bomb. This type of cipher uses a ‘key’ that refers to the amount of ‘shifts’ each letter has undergone. ‘+10’, ‘+5’, and ‘+13’ shift are shown below.



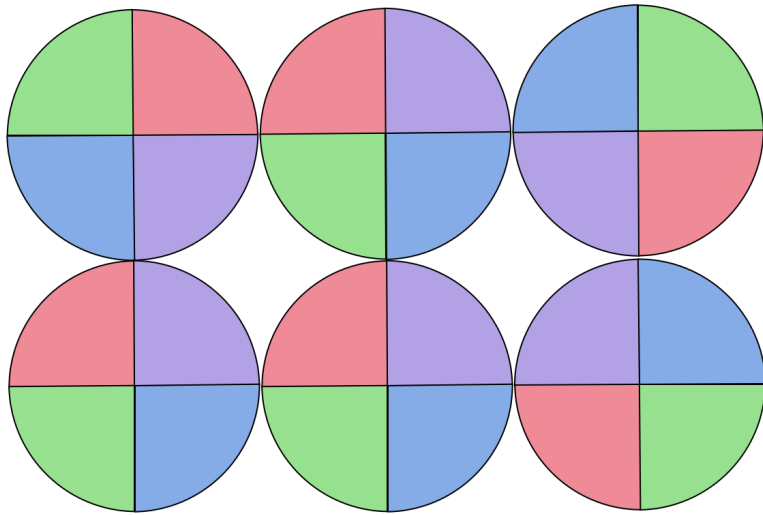
The ‘key’ repeats itself over the entire encoded message. For example, a cipher with the key ‘+10, +5, +13’ would encode ‘hello world’ as ‘xzybj jemytx’. The cipher on the bomb has a key of ‘+ a , + b , + c ’.

There are 5 large red buttons on the bomb, each with a unique value. The values correspond to the following.

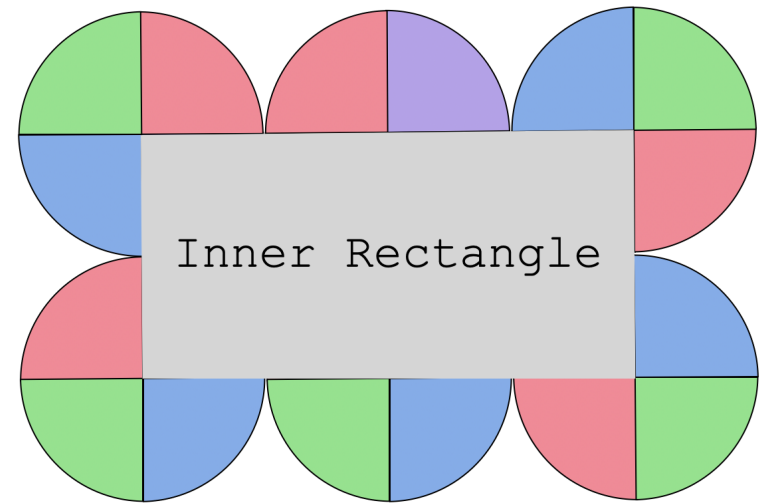
1. Botton I: The value is the expected number of minutes before the bomb is *primed* (rounded to the nearest minute).
2. Botton II: Has the value a
3. Botton III: Has the value b
4. Botton IV: Has the value d
5. Botton V: $P(\text{Bomb } \textit{Primed} \mid \text{Bomb } 5/8 \textit{ Primed})$ written in lowest terms is $\frac{f}{g}$. Button V has value is $f + g$.

A red button is a *deactivator* if when it's value is removed the remaining 4 buttons have a non integer mean. Press all the *deactivators*.

The bomb is *5/8 Primed* if *exactly* 5 of the 8 dials have the same colour on the inner rectangle.



5/8 Primed Bomb



Inner Rectangle

The probability that the bomb is *5/8 Primed* can be written in lowest terms as $\frac{d}{e}$.