

## Part A - Warm-up Fold

### Activity :

Take a square sheet. Fold one corner to any point on the opposite side. Open and observe the crease pattern.

### Explore :

- Do all folds look the same?
- What changes when the point moves?
- What stays the same?

## Part B - Haga's first theorem

### Activity :

Take a square sheet. Find a crease pattern which would get you a pythagorean triple. Prove that.

### Explore:

How many such pythagorean triplets can you find in this same fold?

## Part C - Folding a third

### Activity:

Use the same crease pattern as in Part B. Find the other side lengths and mark a point which is exactly one third the side of the square (and not just an approximation)

### Explore:

Prove that this fold will always be one third of the square length.

## Part D - Folding any fraction

### Activity:

Find a fold which would give you any fraction - say,

### Explore:

Find all fractions that you can obtain in a single fold.

## Part E - Midy's Theorem (Repeating Decimal Split Magic)

### Activity:

1. Pick any fraction whose decimal expansion repeats (e.g.,  $1/7$ ,  $1/13$ ,  $1/17$ ).
2. Write one full repeating block.
3. Split it into 2 equal halves and add them.

### Explore:

- Is the sum always a multiple of 9?
- Try 5 different examples.
- Can you explain this using place-value reasoning or modular arithmetic?
- What would happen if you split it into 3 equal parts and add them?