Number Patterns

Divisibility Rules

- Divisibility by 3. What is the remainder when you divide:
  - 1 by 3?
  - 10 by 3?
  - 100 by 3?
  - Pattern? Rule?
- Divisibility by 9. Pattern? Rule?
- Try some others (e.g., 1/7). Rules?

Infinite Decimals

- $0.4444 \ldots = 0.\bar{\bar{4}} = ??$
- $0.\overline{32} = ??$
- Pattern?
- $0.\overline{42381} = ??$

Infinite Fractions

- $\sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \cdots}}}}$
- Guesses?
- Thoughts?

Know Your Squares

- Table 1 to 25
- Look at successive differences
- Try cubes, 4th powers
- $(x + 1)(x - 1)$
- $(x + 2)(x - 2)$
- $(x + 3)(x - 3)$

List of Topics – Selection (top 5)