San Diego Math Circle
Fermat Class
09/27/2008

Fill in the missing numbers in the following patterns:

1. $1, 2, 3, 4, \_\_, \_\_, \_\_, 8, 9, ...$

2. $2, 5, 8, \_\_, \_\_, \_\_, 20, 23, ...$

3. $1, 2, 4, \_\_, \_\_, \_\_, 64, 128, ...$

4. $10, 8, 6, \_\_, \_\_, 0, -2, -4, \_\_, \_\_, \_\_, ...$

5. $128, \_\_, \_\_, -16, 8, -4, \_\_, \_\_, ...$

6. $64, \_\_, 144, 216, \_\_, \_\_, 729, ...$

Compute the following sums:

1. $1 + 2 + 3 + ... + 199 + 200$

2. $3 + 6 + 9 + ... + 597 + 600$

3. $2 + 5 + 8 + ... + 596 + 599$

4. $-20 + -16 + -12 + .. + 144 + 148 + 152$

Compute the following sums:

1. $1 + 2 + 4 + .. + 256 + 512$

2. $1 + -3 + 9 + ... + -243 + 729$

3. $1 + \frac{1}{2} + \frac{1}{4} + ...$

4. $1 + -\frac{1}{3} + \frac{1}{9} + -\frac{1}{27} + ...$

Convert the following repeating decimals into fractions:

1. $0.\overline{3} = 0.3333...$

2. $0.\overline{6} = 0.6666...$

3. $0.\overline{9} = 0.9999...$

4. $0.\overline{152} = 0.152152152...$

5. $0.7\overline{2} = 0.72222...$

6. $0.23\overline{45} = 0.23454545...$