Math5900 Midterm 1 Review

1. Find the 912th number in this sequence
   4, 11, 18, 25, ...

2. Write a mathematically convincing argument to explain why the sum of any five consecutive integers is always divisible by 5.

3. Write a mathematically convincing argument to explain the formula
$$1+2+3+...+n=\frac{n(n+1)}{2}$$

4. Convert these numbers to a different base as indicated.
   (a) 122101_3 to base 10

   (b) 542_6 to base 10

   (c) 191 to base 7

   (d) 817_9 to base 10

   (e) 163 to base 2

5. Draw a Venn Diagram for all the number systems (including fractions) and place these numbers in the 2π proper place in the Venn Diagram.
   (a) 0.12
   (b) $\dfrac{0}{7}$
   (c) -16
   (d) $\sqrt{10}$
   (e) 2π
   (f) -4.2
   (g) $13.15\overline{6}$
   (h) $\dfrac{-3}{5}$
   (i) 1
   (j) 2
   (k) $3.\overline{9}$
   (l) $\dfrac{-15}{5}$
   (m) $\sqrt{225}$
   (n) $\dfrac{1}{4}$
   (o) 64%
   (p) 3.787787778...

6. Order these numbers and then place them on a number line.

(a) $\dfrac{3}{20}$

(b) 75%

(c) 0.67

(d) ½

(e) 0.1

(f) $\dfrac{1}{5}$

(g) $0.\overline{9}$

(h) 0

(i) $\dfrac{2}{3}$

(j) 0.8

7. Convert these numbers from one form to another to fill up the table.

Decimal	Percent	Fraction
	69.00%	
		$\dfrac{11}{7}$
3.2		
$0.1\overline{23}$		
		$\dfrac{21}{75}$

8. A letter was posted that was covered with 10-cent stamps and 5-cent stamps. There were 12 stamps and the total postage was 70 cents. How many of each stamp were on the letter?

9. Two 2-digit numbers satisfy the following conditions:
   - The sum of the digits in each number is 10.
   - All four digits are different.
   - The sum of the numbers is 155.

Determine the two numbers.

10. If a fence requires a post every 10 feet, how many posts are required for a fence that measures 100 x 100 feet?