

**Question1:**

For each number, check all that apply.

	Natural	Integer	Rational	Irrational	Real	Prime	Composite
1	✓	✓	✓	✗	✓	✗	✗
0	✗	✓	✓	✗	✓	✗	✗
$\sqrt{2}$	✗	✗	✗	✓	✓	✗	✗
$\frac{1}{71}$	✓	✓	✓	✗	✓	✗	✗
$\frac{2}{7}$	✗	✗	✓	✗	✓	✗	✗
$\frac{\pi}{5}$	✗	✗	✗	✓	✓	✗	✗
3.14	✗	✗	✓	✗	✓	✗	✗
$\sqrt{81} = 9$	✓	✓	✓	✗	✓	✗	✗
12.535353...	✗	✗	✓	✗	✓	✗	✗
1.1212211222...	✗	✗	✗	✓	✓	✗	✗
119	✓	✓	✓	✗	✓	✗	✗
$\frac{112}{2} = \frac{1}{4}$	✗	✗	✓	✗	✓	✗	✗

**Question2:**

Identify the property of real numbers or the property of equality that is illustrated in the following statements:

- $a(b+c) = a(c+b)$  Comm. prop for +
- $a(b-c) = ab - ac$  Distributive prop.
- If  $x = a+b$  and  $a+b = y+2$ , then  $x = y+2$  Transitive prop of =
- If  $x = 3$  and  $y = x-a$ , then  $y = 3-a$  Substitution
- $2 + \sqrt{3}$  is a real number Closure for +
- If  $2 = x^2 + 3x$  then  $x^2 + 3x = 2$  Symmetry for =
- $2\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)2$  Comm prop. for x

Solution of Recitation P1.

1) 1 is not prime & not composite  
 0 is not natural nbr,

$\sqrt{2} \in \mathbb{H}$

74 prime

$\frac{2}{7}$  rational ( $\because$  fraction of integers)

$\frac{\pi}{5}$  irrational ( $\because \pi$  is irrational)

3.14 terminating then rational

$\sqrt{81} = 9$

12.535353... repeating  $\Rightarrow$  rational

1.1212211222... non terminating, non repeating  $\Rightarrow$  irrational

119 =  $7 \times 17$  composite

$\frac{1}{2} = \frac{1}{2} \div 2 = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$  rational.

3)  $A = \{z \mid z = -|x| + x, \text{ } x \text{ integer with } -4 \leq x \leq 0\}$

$= \{z \mid z = -|x| + x, \text{ } x = -3, -2, -1, 0\}$   
 $= \{-6, -4, -2, 0\}$

$B = \{z \mid z = 2x - 2, \text{ where } x \text{ integer with } -3 \leq x < 0\}$   
 $= \{z \mid z = 2x - 2, \text{ } x = -3, -2, -1\}$   
 $= \{-8, -6, -4\}$

$A \cap B = \{-6, -4\}$

$$\textcircled{P} \text{ a) } -6 \leq x \leq -3 \Rightarrow x+3 \leq -3+3=0 \Rightarrow |x+3| = -(x+3)$$

$$-6 \leq x \leq -3 \Rightarrow 0 \leq x+6 \leq 3 \Rightarrow x+6 \geq 0 \Rightarrow |x+6| = x+6$$

$$|x+3| + |x+6| = -(x+3) + (x+6)$$

$$= \boxed{-2x - 9}$$

$$\text{b) } -3 < x < 0 \Rightarrow x < 0 \Rightarrow |x| = -x$$

$$-3+3 < x+3 \Rightarrow x+3 > 0 \Rightarrow |x+3| = x+3$$

$$\frac{x}{|x| + |x+3|} = \frac{|x|}{|x| + |x+3|} = \frac{-x}{-x + (x+3)} = \frac{-x}{3}$$

$$= \boxed{-\frac{2x}{3}}$$

$\textcircled{Q5}$

1)  $\textcircled{F}$  1 is a prime integer not prime & not composite

$$2) \textcircled{F} 1 \div 2 = \frac{1}{2} = 0.5 \neq 2 \div 1 = 2$$

$$3) \textcircled{F} -2 \frac{1}{5} = -(2 + \frac{1}{5}) = -(\frac{10}{5} + \frac{1}{5}) = -\frac{11}{5}$$

Multiplicative inverse is  $-\frac{5}{11}$

4)  $\textcircled{F}$   $x$  can be negative ~~also~~  $x = -2$

$$|-x| = | -(-2) | = |2| = 2 \neq (-2) = x$$

$$5) \textcircled{F} x < 0 \Rightarrow x-1 < 0 \Rightarrow |x-1| = -(x-1) = 1-x \neq x+1$$

$$6) \textcircled{T} x \leq -1 \text{ \& } -2 \leq x \leq 6$$

$$(-\infty, -1] \cap [-2, 6] = (-2, -1]$$

$$7) \textcircled{T} d(x, -3) \neq 8$$

$$\boxed{|x+3| \leq 8}$$