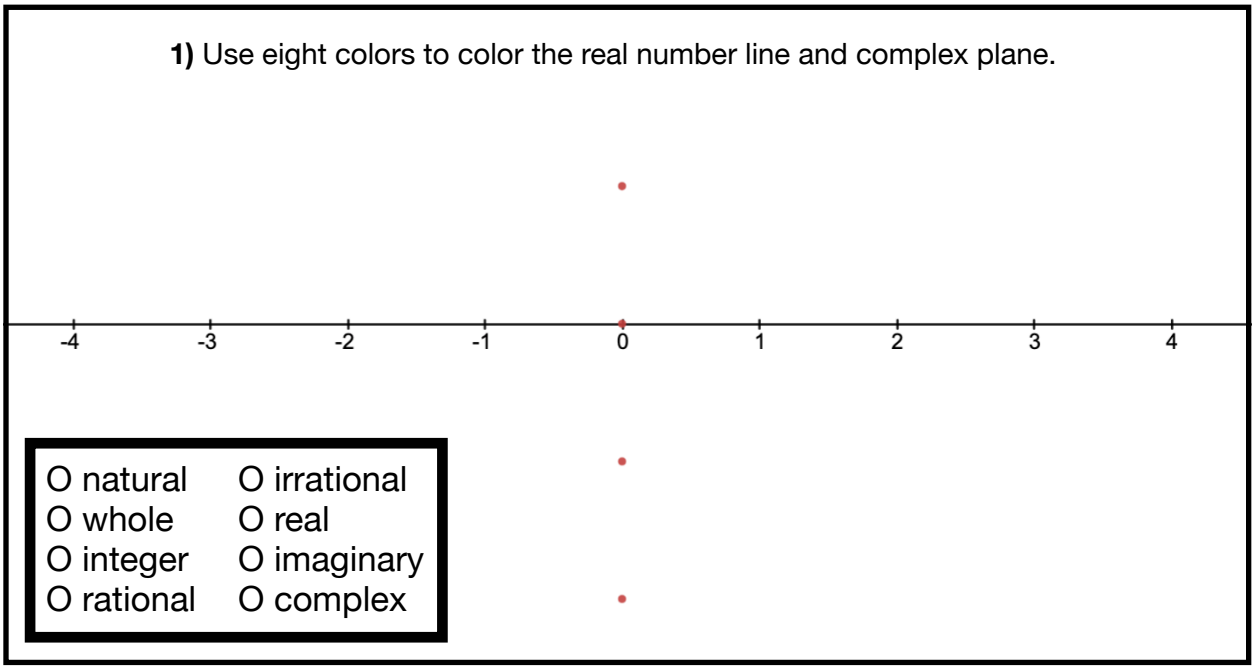
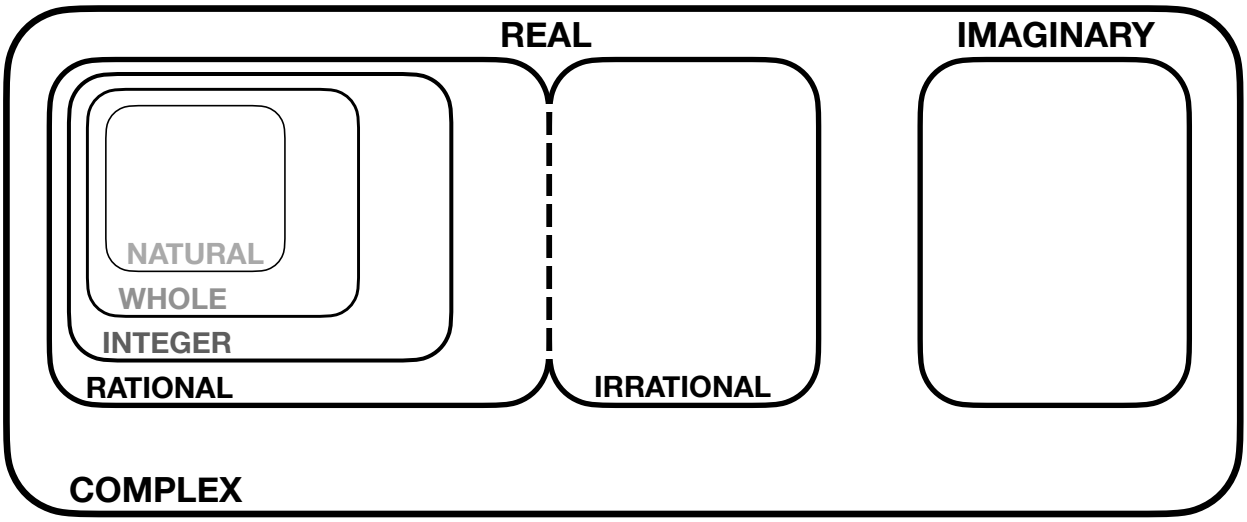
Math II — Number Systems Name _____

1) Use eight colors to color the real number line and complex plane.



O natural	O irrational
O whole	O real
O integer	O imaginary
O rational	O complex

2) Fill the Venn diagram with all 21 letters below. Each region will have exactly three.



$A = \frac{\sqrt{50}}{\sqrt{2}}$ $B = 5\pi$ $C = 0.77777...$ $D = \frac{17}{8}$ $E = -3 - 2i$ $F = \pi - \pi$

$G = 17$ $H = 7i^3$ $I = 2i$ $J = 2 + \sqrt{7}$ $K = 4i^2$ $L = i(2i - 4)$

$M = \sqrt{-9}$ $N = \pi + 4i$ $O = 0$ $P = \sqrt{27} \cdot \sqrt{3}$ $Q = 4.28932219...$

$R = 2i^2 + 2$ $S = -2.414141...$ $T = \frac{-6\pi}{2\pi}$ $U = \sqrt{-9} \cdot \sqrt{-4}$

Closure: when an operation is performed within a number system and the result is *guaranteed* to be in the same number system.

Closed	Not Closed
Integer + Interger = Integer since this is *always* true, integers are **closed** under addition. Proof: 6 + 12 = 18	**Integer ÷ Integer = Integer** since this is only *sometimes* true, integers are **not closed** under division. Proof: 6 ÷ 12 = 0.5

Complete the table by circling "closed" or "not closed," and then give an example or counterexample for proof.

Hint: 16 of these boxes are not closed.

	Addition	Subtraction	Multiplication	Division
Natural	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Whole	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Integer	**closed** or **not closed** Proof: **6 + 12 = 18**	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof: **6 ÷ 12 = 0.5**
Rational	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Irrational	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Real	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Imaginary	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:
Complex	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof:	**closed** or **not closed** Proof: