

Homework 1

The following problems are similar to problems in the textbook (pages 14-16), which have solutions (pages 17-19). Feel free to look at those solutions if you need a hint. Also, feel free to make discussion posts on Canvas or look up posts that are already made.

1. To each of the following sets

$$(-1, 5] \cap [0, 4] \cap [1, 6],$$

$$([-2, 4) \cup (5, 7]) \cap [3, 6],$$

$$\{x \mid -2 < x < 2 \text{ or } x = 3\},$$

$$\{x \mid -2 < x < 2 \text{ and } x = 3\},$$

$$\{x \mid x \leq 1 \text{ or } x \neq 3\}$$

do the following:

- (a) Sketch the set on the Real Number line.
 - (b) Based on the picture, express the set in interval notation.
2. Consider the points $A(2, 3)$, $B(-3, -2)$, $C(-5, 2)$, $D(4, 0)$, $E(0, 3)$, $F(\sqrt{2}, -\sqrt{3})$.
 - (a) Plot these points on the Cartesian coordinate plane.
 - (b) What quadrants do A, B, C, F lie in?
 - (c) Is the triangle ABC an isosceles triangle? If so, what is the apex?
 - (d) Find the coordinates of the midpoint of the line segment CD .
 3. Find all the points $(1, x)$ which are 5 units from the point $(-2, -3)$.
 4. A rational number is any number that can be written as a fraction, where both the numerator and the denominator are integers. How many rational numbers are there in the interval $(0, 1)$? Explain your answer.