Math-1003b Homework #7 Solutions

Reading

- Section 9.1 and 9.2

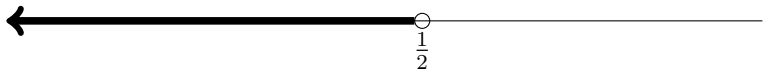
Problems

1). Let $A = \{x \in \mathbb{R} \mid -1 \leq x < 3\}$ and $B = \{x \in \mathbb{R} \mid x < \frac{1}{2}\}$.

a). Graph A and express in interval notation.

$A = [-1, 3)$

b). Graph B and express in interval notation.

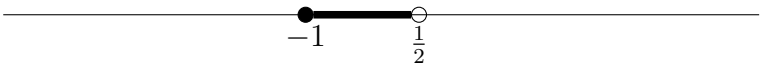


$B = (-\infty, \frac{1}{2})$

c). Graph $A \cup B$ and express in interval notation.

$A \cup B = (-\infty, 3)$

d). Graph $A \cap B$ and express in interval notation.



$A \cap B = [-1, \frac{1}{2})$

2). Let $f(x) = 3 - 2x$

a). Solve for x:

$$5 < f(x) \leq 9$$

and express the answer in interval notation.

Since this is a compound inequality (and/intersection) we can solve simultaneously:

$$\begin{aligned} 5 &< 3 - 2x \leq 9 \\ 2 &< -2x \leq 6 \\ -1 &> x \geq -3 \\ -3 &\leq x < -1 \end{aligned}$$

$x \in [-3, -1)$

b). Solve for x:

$$5 < f(x) \text{ or } f(x) > 9$$

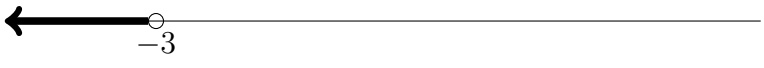
and express the answer in interval notation.

Solve each inequality separately:

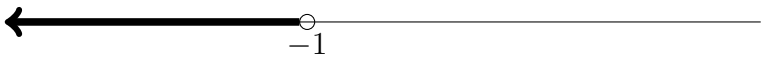
$3 - 2x > 5$	$3 - 2x > 9$
$-2x > 2$	$-2x > 6$
$x < -1$	$x < -3$

Now graph each one and take the union (or):

$A = (-\infty, -1)$



$B = (-\infty, -3)$



$A \cup B = (-\infty, -1)$

Note that A is a superset of B, so the union will be the superset.