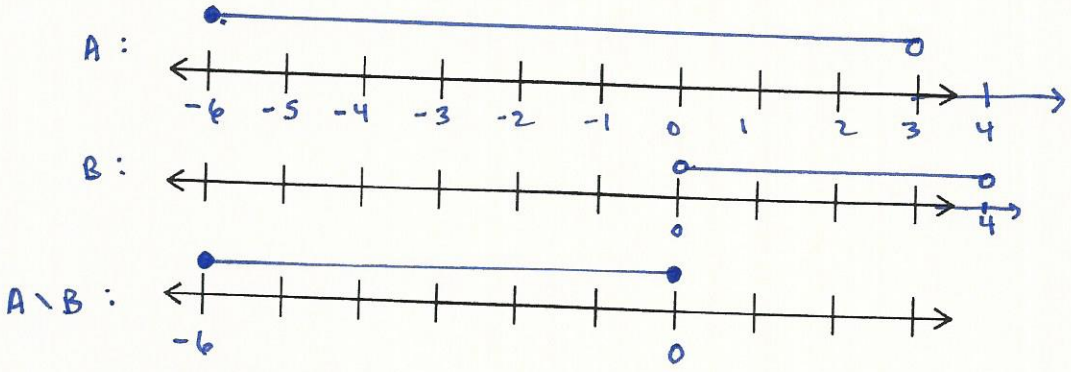
Operations on Sets of Real Numbers

Use the number lines given to perform the following operations. As well as "number line" form, give your answer in interval notation and set builder notation:

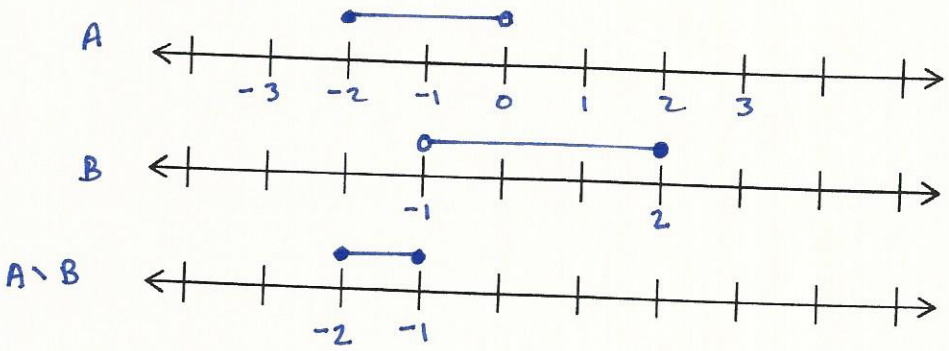
1. $[-6,3[\setminus]0,4[$ (A = $[-6,3[$, B = $]0,4[$)



interval notation : $[-6, 0]$

set-builder : $\{x \in \mathbb{R} \mid -6 \leq x \leq 0\}$

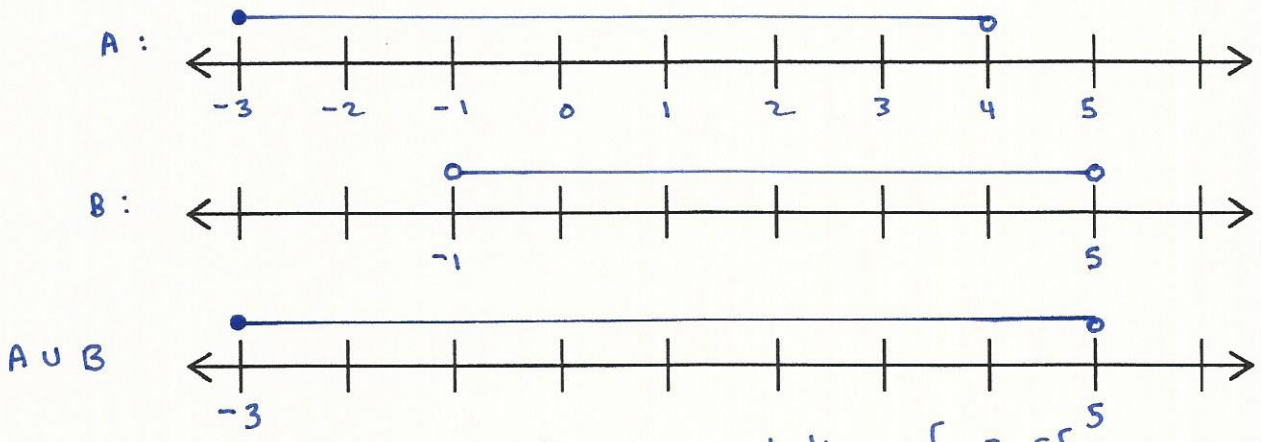
2. $[-2,0[\setminus]-1,2]$ (A = $[-2,0[$, B = $]-1,2]$)



interval notation : $[-2, -1]$

set-builder : $\{x \in \mathbb{R} \mid -2 \leq x \leq -1\}$

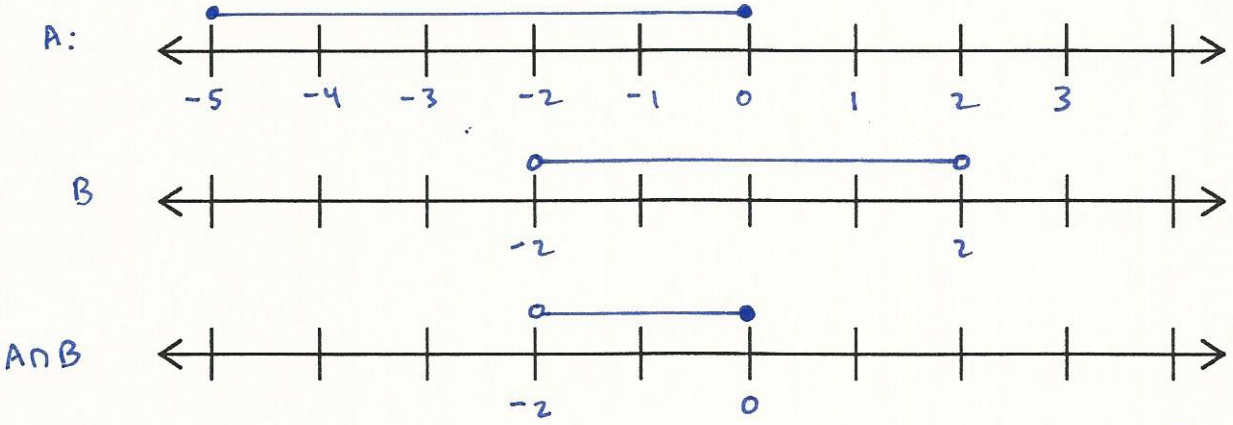
3. $[-3,4[\cup]-1,5[$ (A = $[-3,4[$, B = $]-1,5[$; $\cup$ = union)



interval notation : $[-3, 5[$

set-builder : $\{x \in \mathbb{R} \mid -3 \leq x < 5\}$

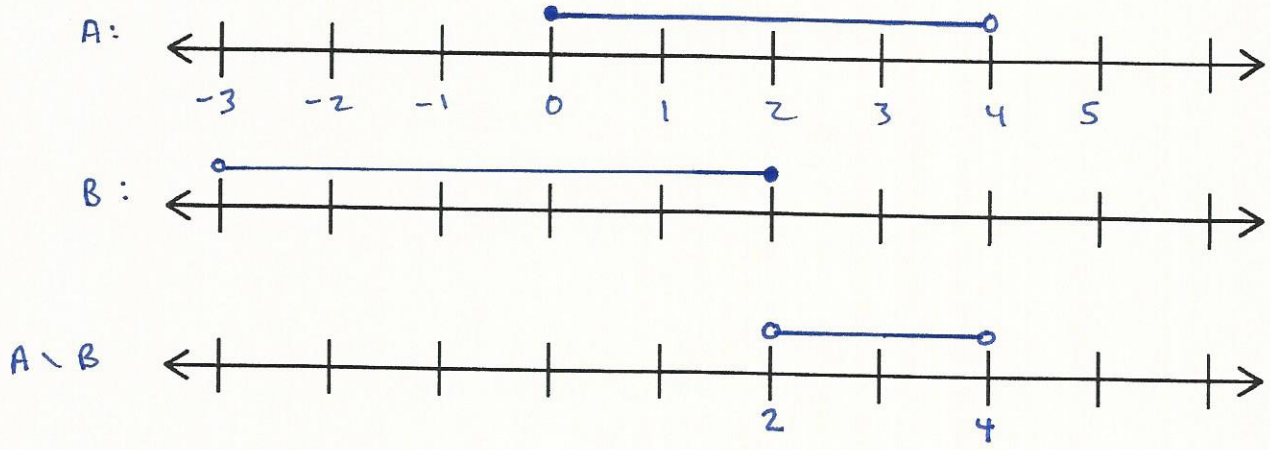
4. $[-5,0] \cap]-2,2[$ (A = $[-5,0]$, B = $]-2,2[$; $\cap$ = intersection)



interval notation : $]-2, 0]$

set-builder : $\{x \in \mathbb{R} \mid -2 < x \leq 0\}$

5. $\overset{A}{[0,4[} \setminus \overset{B}{]-3,2]}$

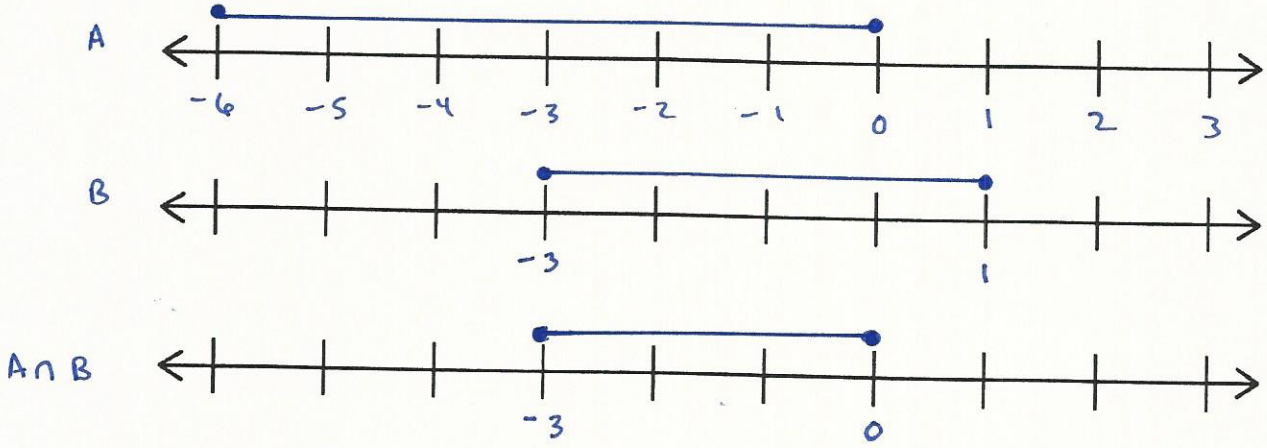


interval notation: $]2,4[$

Set-builder: $\{x \in \mathbb{R} \mid 2 < x < 4\}$

6. $\overset{A}{[-6,0]} \cap \overset{B}{[-3,1]}$

↑ intersection



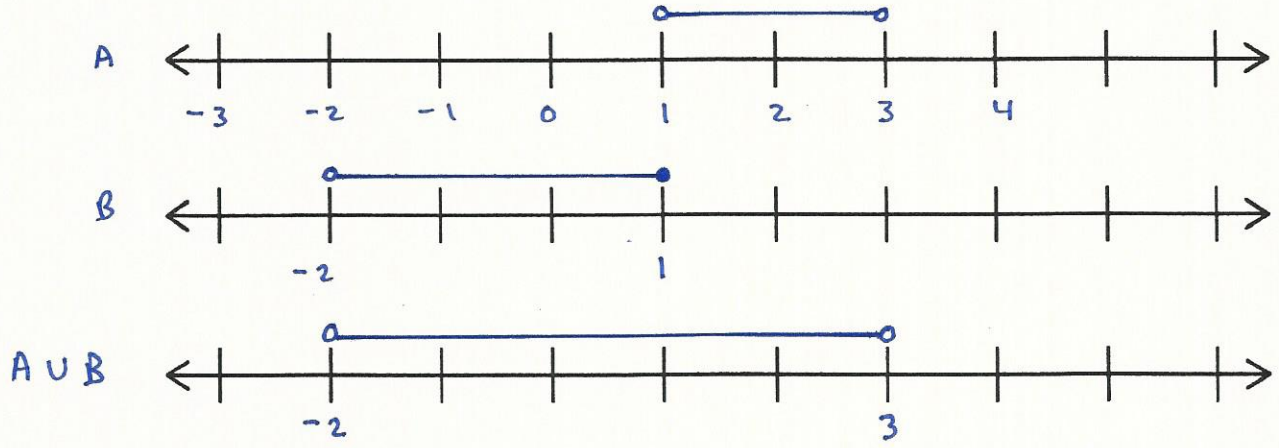
interval notation: $[-3,0]$

Set-builder: $\{x \in \mathbb{R} \mid -3 \leq x \leq 0\}$

7. $]1,3[\cup]-2,1]$

A B

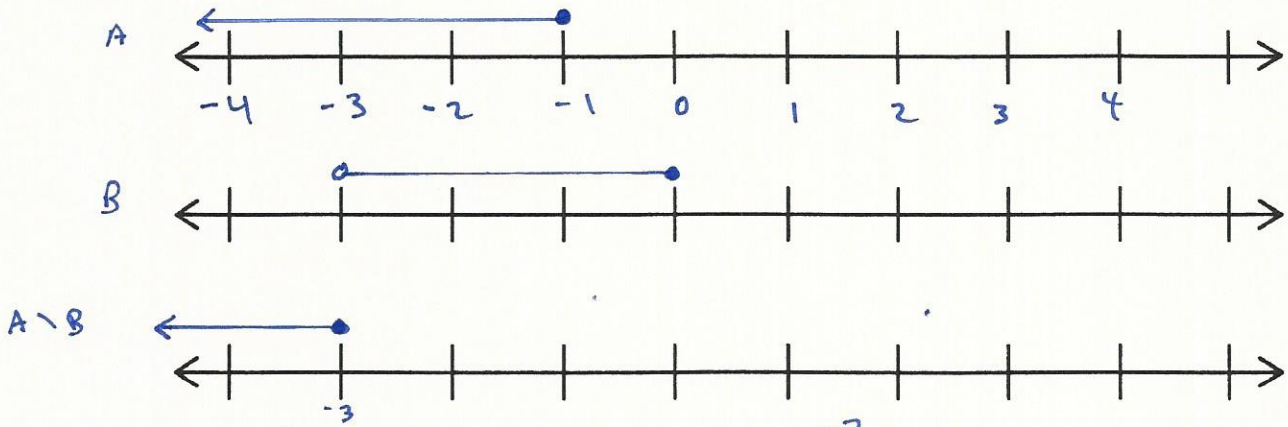
↑ union



interval notation : $]-2,3[$

{set-builder : $x \in \mathbb{R} \mid -2 < x < 3\}$

8. $-\infty,-1] \setminus]-3,0]$

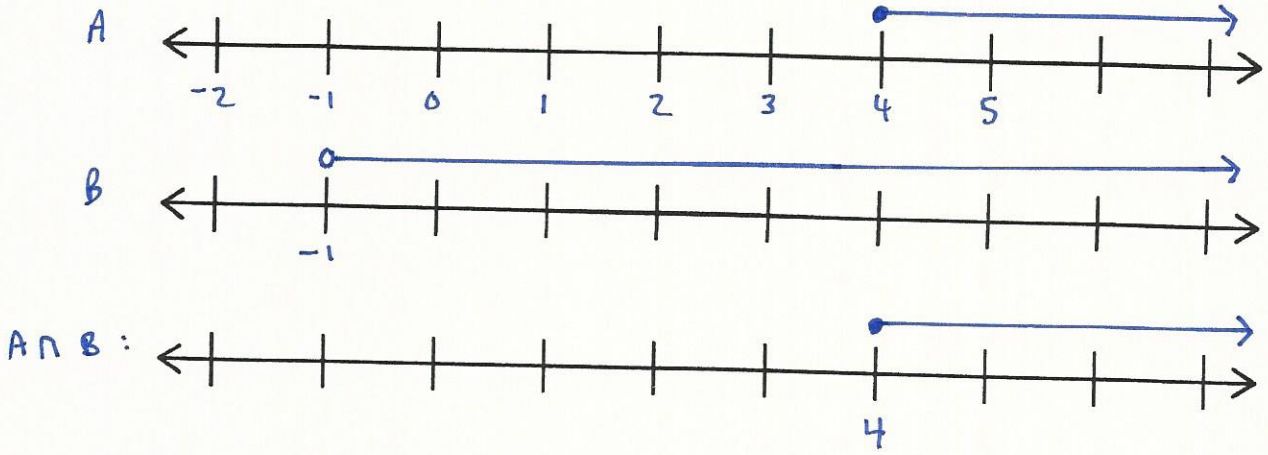


interval notation : $-\infty, -3]$

set-builder : $\{x \in \mathbb{R} \mid x \leq -3\}$

A B

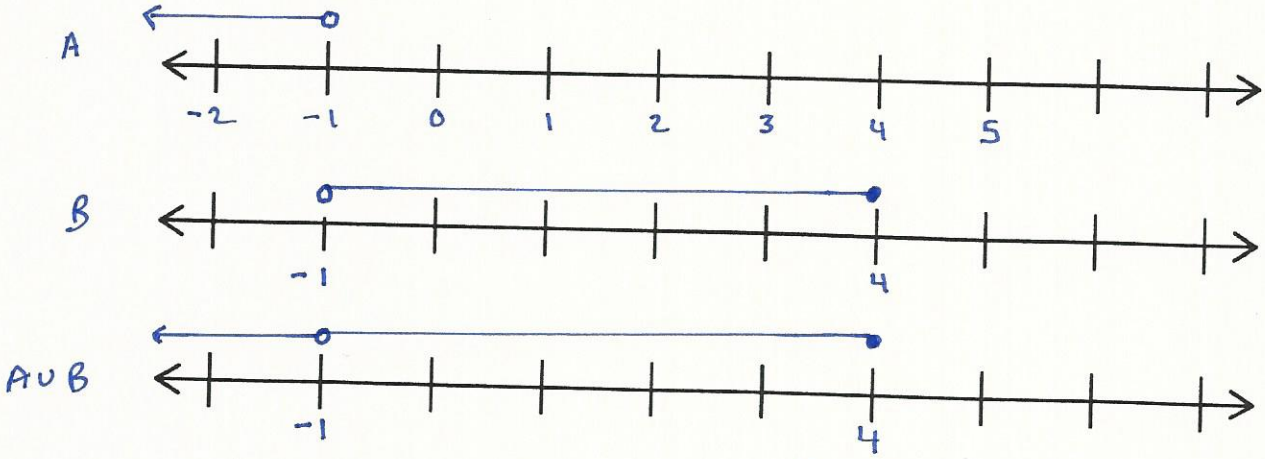
9. $[4,\infty \cap]-1,\infty$



interval : $[4, \infty$

set-builder : $\{x \in \mathbb{R} \mid x \geq 4\}$

10. $-\infty,-1[\cup]-1,4]$

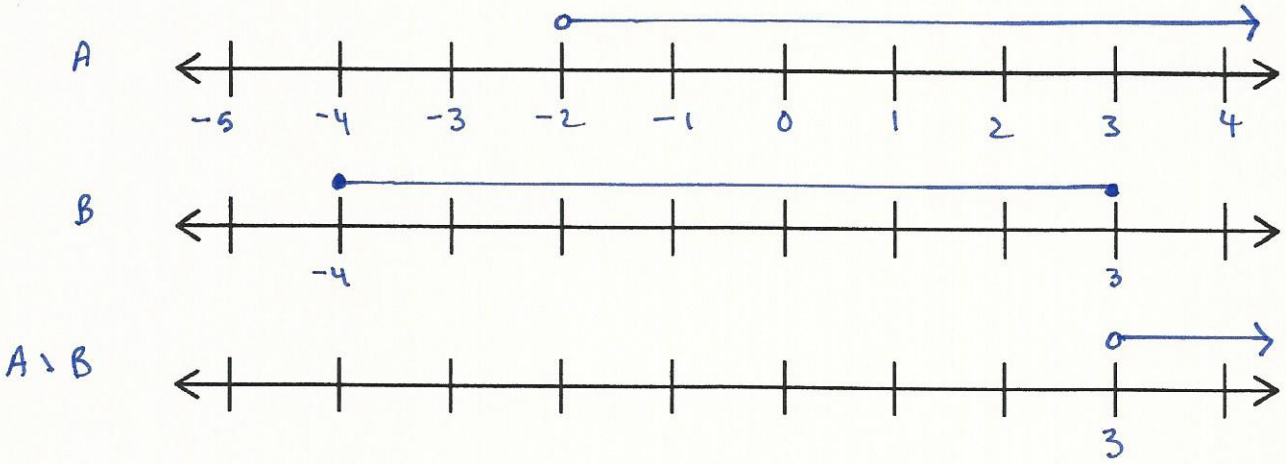


interval : $-\infty, -1[\cup]-1, 4]$

set-builder : $\{x \in \mathbb{R} \mid x < -1 \vee -1 < x \leq 4\}$

A B

11. $]-2,\infty \setminus [-4,3]$

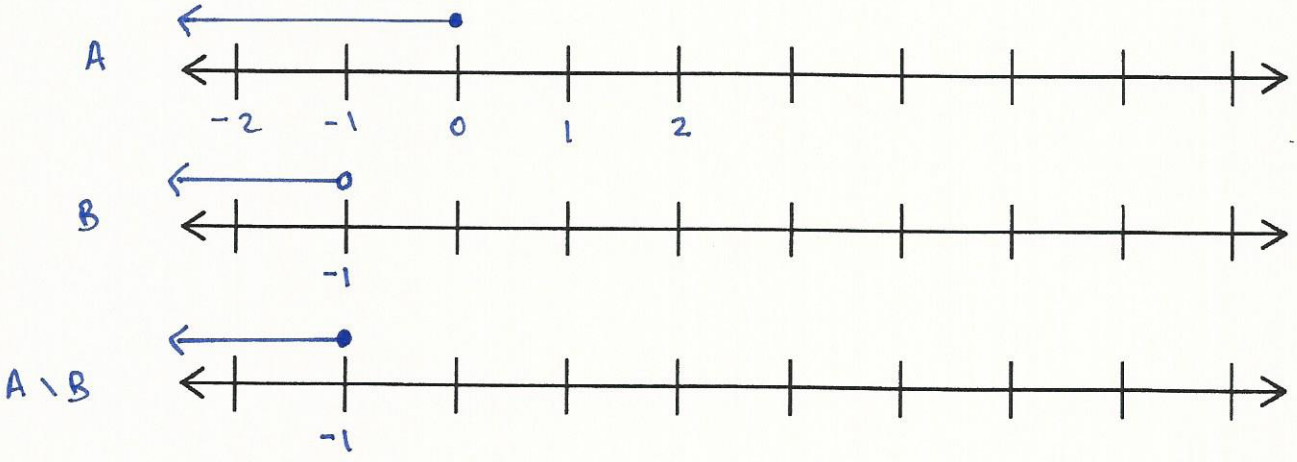


interval : $]3, \infty$

set-builder : $\{x \in \mathbb{R} \mid x > 3\}$

A B

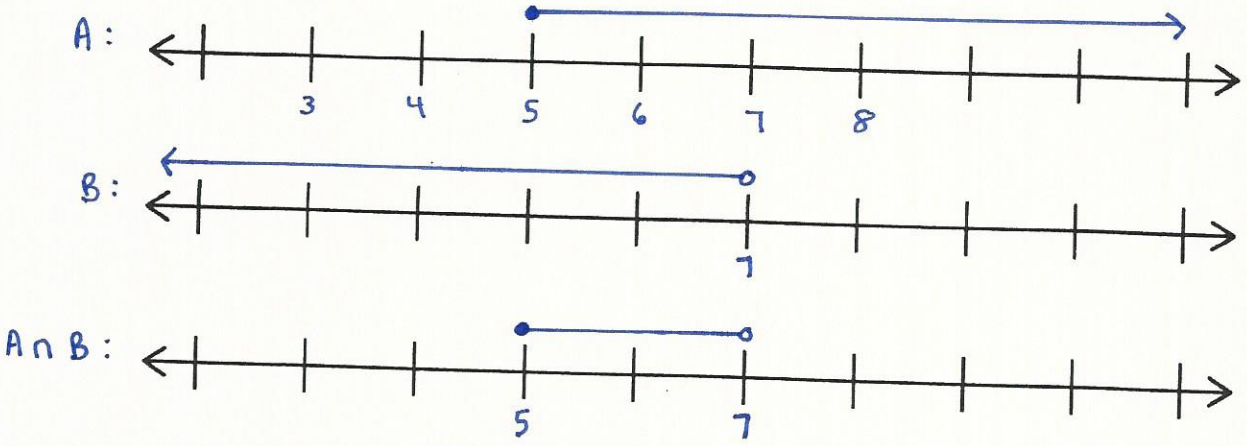
12. $-\infty,0] \setminus -\infty,-1[$



interval : $-\infty,-1]$

set-builder : $\{x \in \mathbb{R} \mid x \leq -1\}$

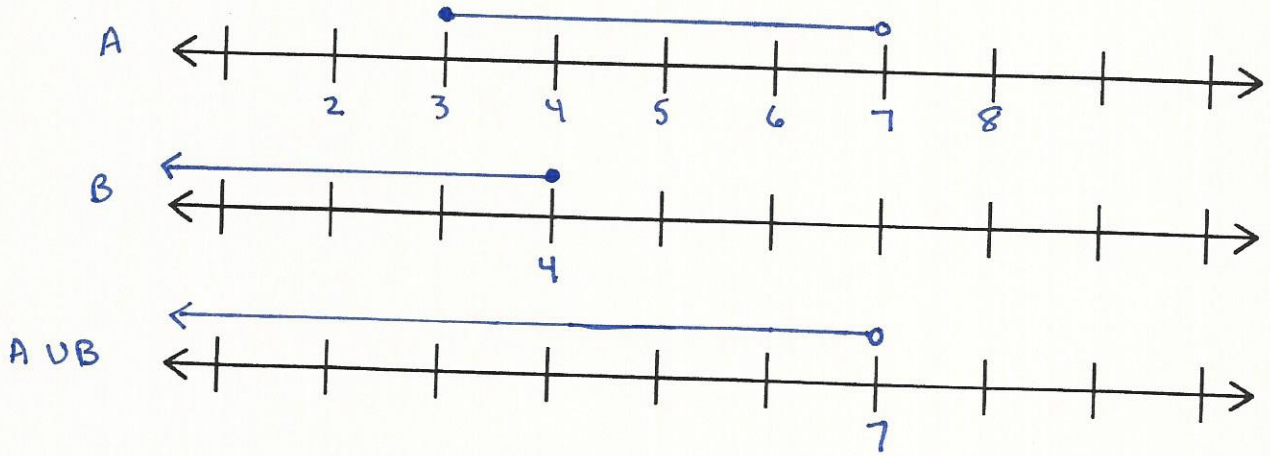
13. $[5,\infty \cap -\infty,7[$ (A: $[5,\infty$, B: $-\infty,7[$)



interval : $[5, 7[$

set-builder : $\{x \in \mathbb{R} \mid 5 \leq x < 7\}$

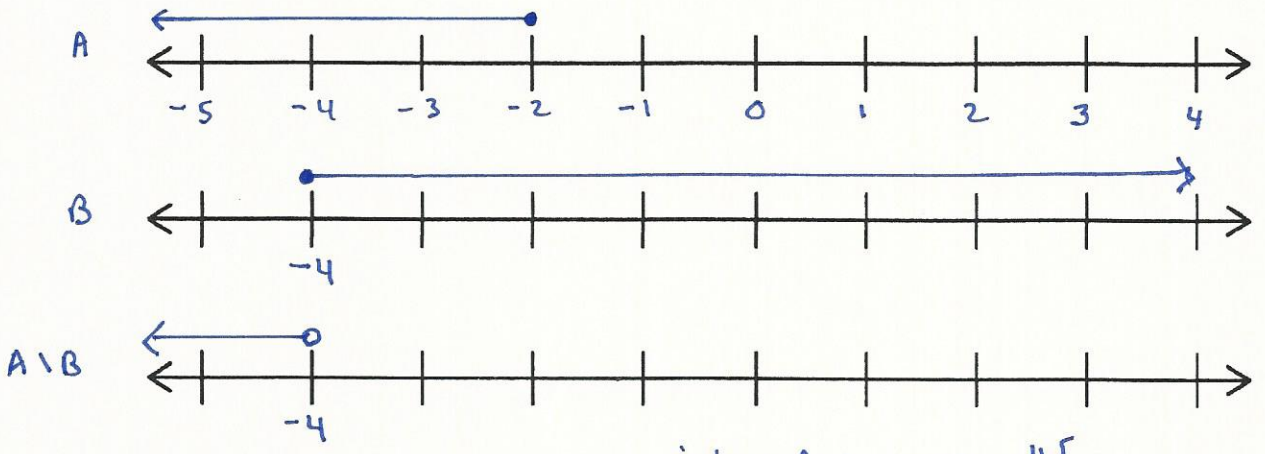
14. $[3,7[\cup -\infty,4]$ (A: $[3,7[$, B: $-\infty,4]$)



interval : $-\infty, 7[$

Set-builder : $\{x \in \mathbb{R} \mid x < 7\}$

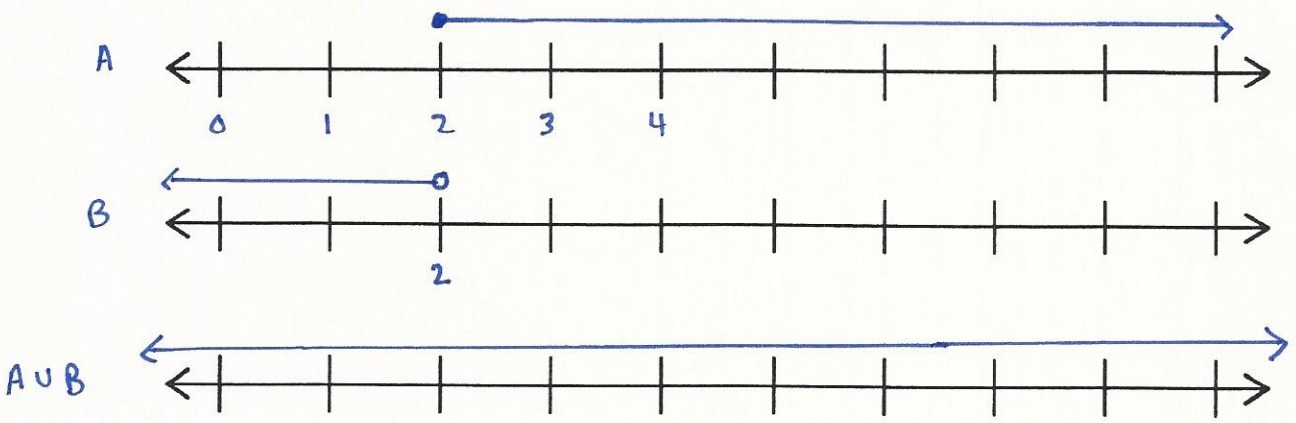
15. $\overset{A}{-\infty,-2]} \;/\; \overset{B}{[-4,\infty}$



interval : $-\infty, -4[$

set-builder : $\{x \in \mathbb{R} \mid x < -4\}$

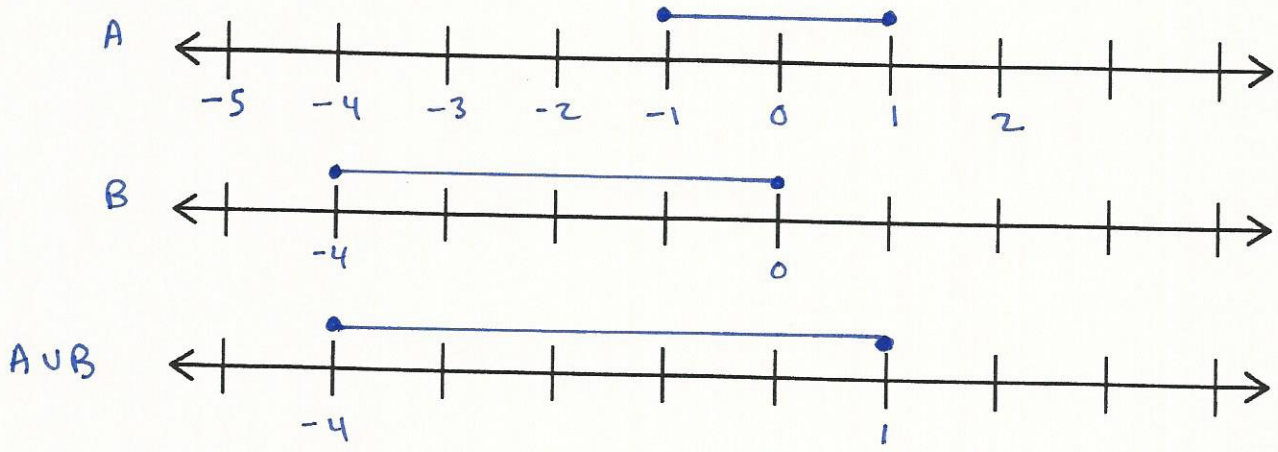
16. $\overset{A}{[2,\infty]} \cup \overset{B}{[-\infty,2[}$



interval : $-\infty, \infty$

set-builder : $\{x \in \mathbb{R} \mid x = \mathbb{R}\}$

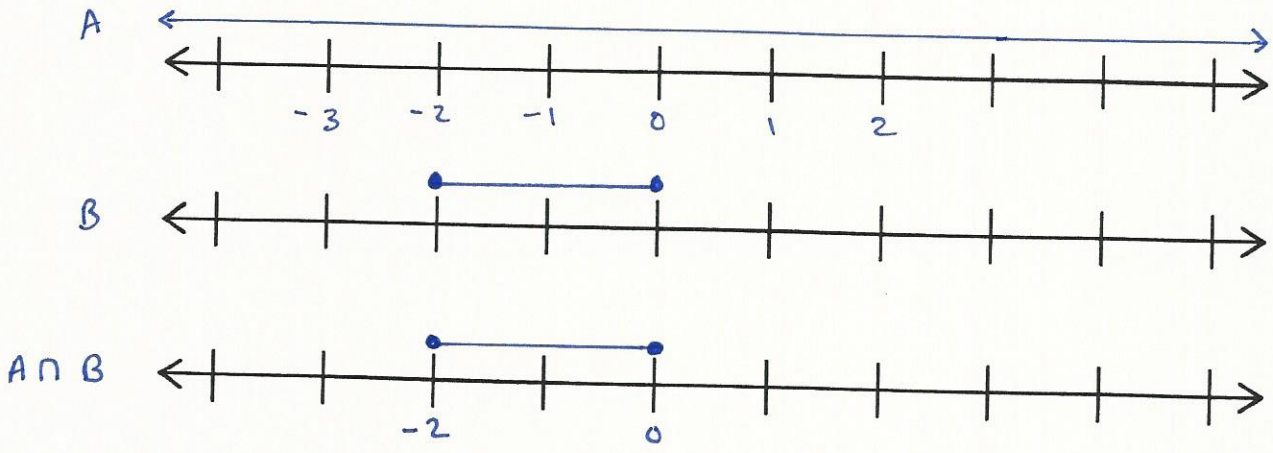
17. $\overset{A}{[-1,1]} \cup \overset{B}{[-4,0]}$



interval : $[-4, 1]$

Set-builder : $\{x \in \mathbb{R} \mid -4 \leq x \leq 1\}$

18. $\overset{A}{(-\infty,\infty)} \cap \overset{B}{[-2,0]}$

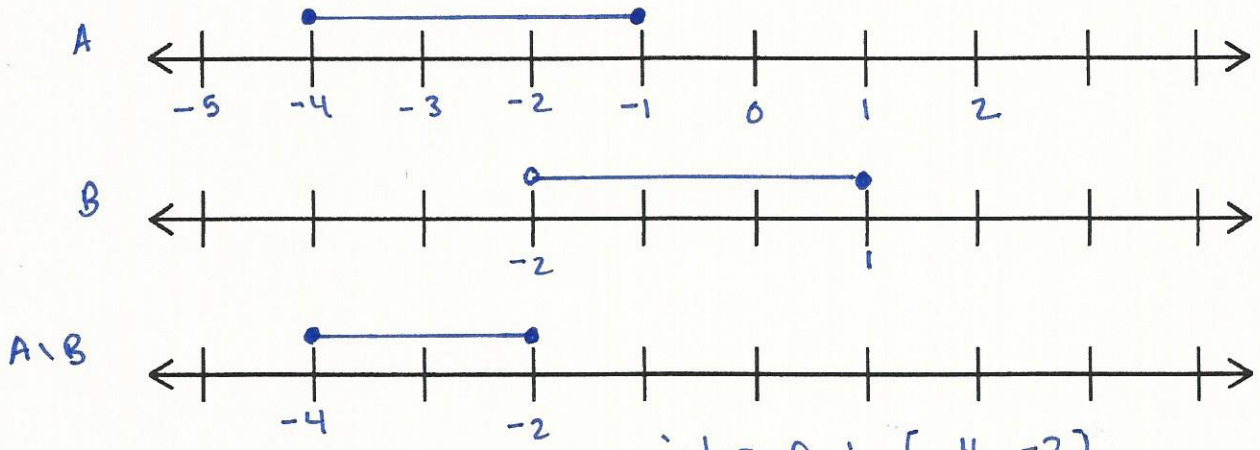


interval : $[-2, 0]$

Set-builder : $\{x \in \mathbb{R} \mid -2 \leq x \leq 0\}$

A B

19. $[-4,-1] /]-2,1]$

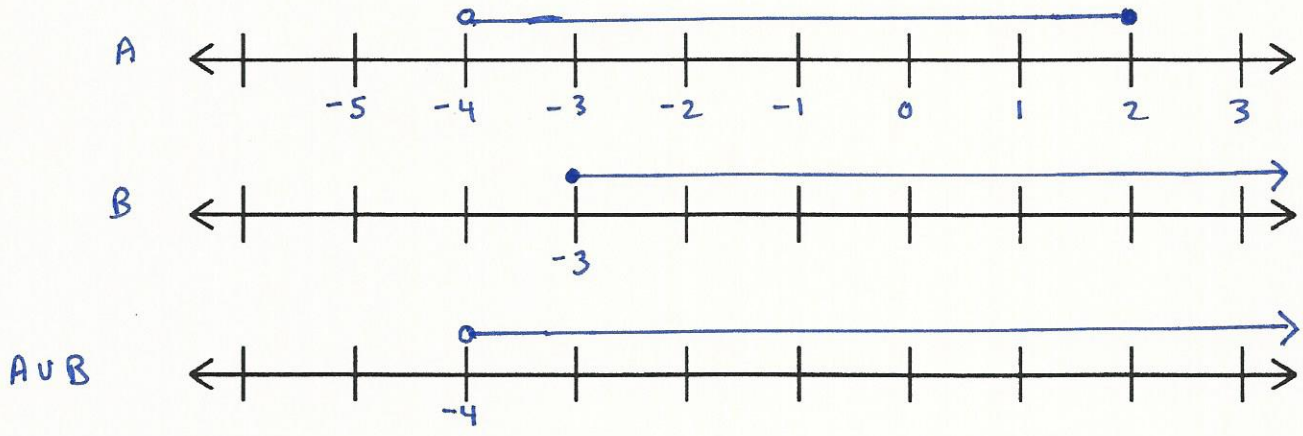


interval : $[-4,-2]$

set-builder : $\{x \in \mathbb{R} \mid -4 \leq x \leq -2\}$

A B

20. $]-4,2] \cup [-3,\infty$



interval : $]-4,\infty$

set-builder : $\{x \in \mathbb{R} \mid x > -4\}$