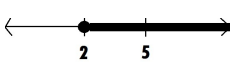
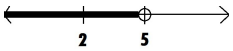
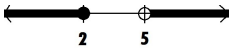
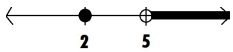
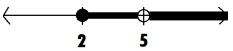
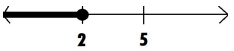
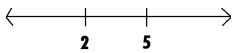
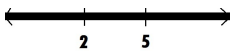
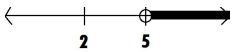
MATH 118
Interval Notation

Things to remember about using interval notation:

- Intervals are sets, so they use the same notation we discussed in Section P1 for sets.
- To join two intervals together, and say that our solution can be in either one of the intervals, we use the $\cup$ symbol. It means "union" and you can think of it as "or."
  Example: $(-3, 0] \cup [1, \infty)$ means our value can either be between -3 and 0 or it can be anything bigger than or equal to 1.
- An open (round) parenthesis is like an open circle on a graph - the value is **NOT** included.
  Example: $(-3, 0)$ means any number between -3 and 0 but NOT including -3 or 0.
- A closed (square) bracket is like a closed circle on a graph - the value **IS** included.
  Example: $(-3, 0)$ means any number between -3 and 0, including -3 and 0.
- We ALWAYS use open parentheses with ∞ or $-\infty$.
  Example: We write $(-\infty, 3) \cup (3, \infty)$. We NEVER write $[-\infty, 3) \cup (3, \infty]$.
- To indicate that your value must be in BOTH segments/intervals, we use the $\cap$ symbol. It means "intersection" and you can think of it as "and."
  Example: $(-3, 0] \cap (-1, \infty) = (-1, 0]$ because only numbers between -1 and 0 are in BOTH of the intervals $(-3, 0]$ AND $(-1, \infty)$.

Examples

Now let's talk about translating logical statements into inequalities. Match the statements below with the intervals and graphs:

(1) $x > 5$ and $x \leq 2$	(I) $(-\infty, 5)$	(A) 
(2) $x < 5$ and $x \leq 2$	(II) $(-\infty, 2]$	(B) 
(3) $x > 5$ or $x \leq 2$	(III) $(5, \infty)$	(C) 
(4) $x < 5$ or $x \leq 2$	(IV) $\emptyset$	(D) 
(5) $x > 5$ and $x \geq 2$	(V) $(-\infty, \infty)$	(E) 
(6) $x > 5$ or $x \geq 2$	(VI) $[2, 5)$	(F) 
(7) $x < 5$ and $x \geq 2$	(VII) $(-\infty, 2] \cup (5, \infty)$	(G) 
(8) $x < 5$ or $x \geq 2$	(VIII) $[2, \infty)$	(H) 
		(I) 
		(J)