Names (pair) _____ Date _____

Inequalities with Absolute Values

$|x-3|<2$

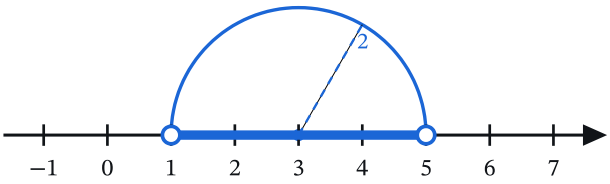
distance from 3 less than 2: **inside** the semicircle

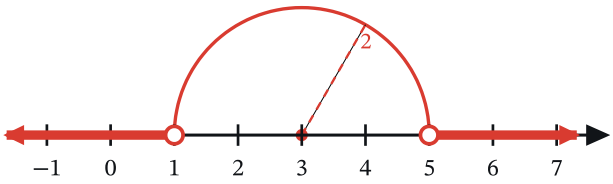
$1<x<5$

$|x-3|>2$

distance from 3 greater than 2: **outside** the semicircle

$x<1$ **or** $x>5$

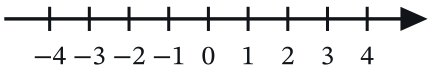
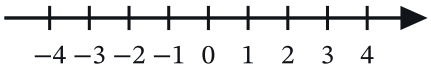
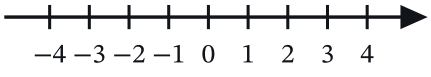




Remember

For $b>0$: $|A|<b \Leftrightarrow -b<A<b$ (inside the semicircle), and $|A|>b \Leftrightarrow A<-b$ or $A>b$ (outside it). For $b<0$, $|A|<b$ has no solution and $|A|>b$ holds for every x.

1 IN PAIRS Solve using distance: draw a semicircle with centre c and radius r, circle whether the solutions are inside or outside it, show them on the line and write them as an interval.

	c	r	On the line	Where?	Interval
$\lvert x\rvert \le 3$				**inside** / **outside**	
$\lvert x-1\rvert > 2$				**inside** / **outside**	
$\lvert x+2\rvert < 1$				**inside** / **outside**	

Names (pair) _____ Date _____

2 ON YOUR OWN Solve algebraically and write as an interval.

$|2x - 1| \leq 5$ → ☐

$|3x + 3| > 6$ → ☐

$|x - 4| < -2$ → ☐

$|5 - 2x| \geq 0$ → ☐

3 IN PAIRS **Find the mistake.** Iva: $|x + 1| > 3 \rightarrow -3 < x + 1 < 3$.

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4 ON YOUR OWN A machine cuts rods 50 cm long, with an allowed error of 0.2 cm. Write the condition for the length d with an absolute value and as an interval.

☐ $d \in$ ☐

5 IN PAIRS Write the set using an absolute value.

$[2, 8]$ → ☐ $(-\infty, -1) \cup (3, +\infty)$ → ☐

The Number Line app · otooly.com/number-line

Intervals mode: type $|x - 3| < 2$ and $|x - 3| > 2$ and compare the pictures.

★ ON YOUR OWN **Exit card.** $|x - 2| < 3 \rightarrow x \in$ ☐