Solve, write your answer in interval notation and graph the solution set.

1a. $2 - 5x$ less than 12

1b. $2(x + 5) - 1$ less than or equal to $x + 5$

Solution

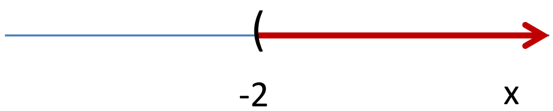
A solution for an inequality in x is a number such that when we substitute that number for x we have a true statement. Interval notation is a way to notate the range of values that would make an inequality true. Solve the first inequality $2 - 5x$ less than 12, written in the form of mathematical inequality $2 - 5x < 12$

$-5x < 12 - 2$

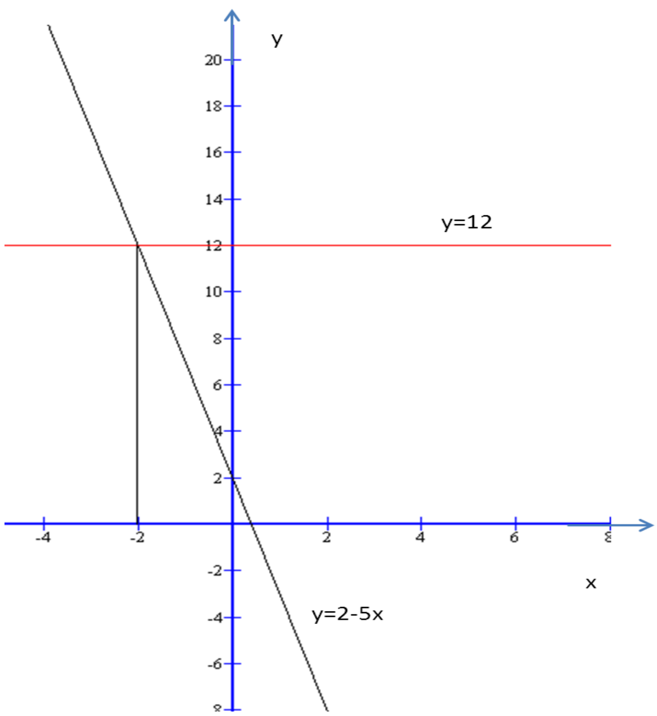
$-5x < 10$

$x > -2$

An open interval does not include where your variable is equal to the endpoint. Interval notation for open Intervals $x \in (-2, +\infty)$.



To satisfy the inequality $2 - 5x$ needs to be less than 12. So we are looking for numbers x such that the point on the graph of $y = 2 - 5x$ is below the point on the graph of y = 12. This is true for $x > -2$. In interval notation the solution set is $x \in (-2, +\infty)$.



Graphs of the functions on either side of the inequality.

1b. $2(x + 5) - 1$ less than or equal to $x + 5$

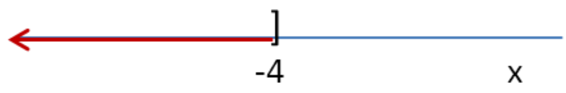
Find all numbers x such that $2(x + 5) - 1 \leq x + 5$. In this case we get a closed interval includes where your variable is equal to the endpoint.

$2(x + 5) - 1 \leq x + 5$

$2x + 10 - 1 \leq x + 5$

$2x - x \leq 5 - 9$

$x \leq -4$



Interval notation for closed interval $x \in (-\infty, -4]$.

To satisfy the inequality $2x + 9$ needs to be less than or equal to $x + 5$. So we are looking for numbers x such that the point on the graph of $y = 2x + 9$ is below the point on the graph of $y = x + 5$. This is true for $x \leq -4$. In interval notation the solution set is $x \in (-\infty, -4]$.