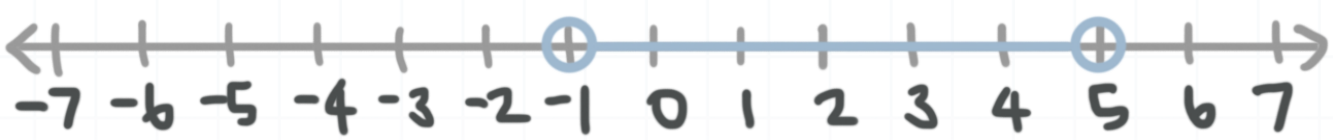
Topic: Graphing conjunctions on a number line

Question: Graph the conjunction $-1 < x < 5$.

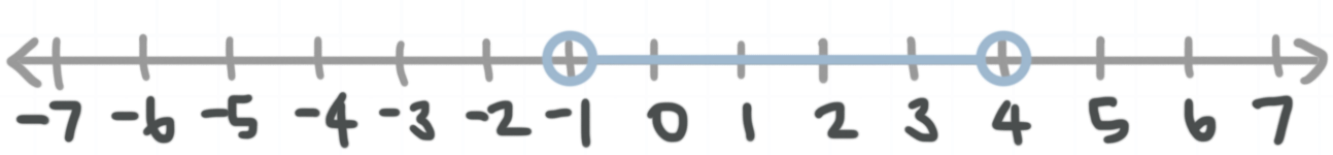
Answer choices:

A



B

C

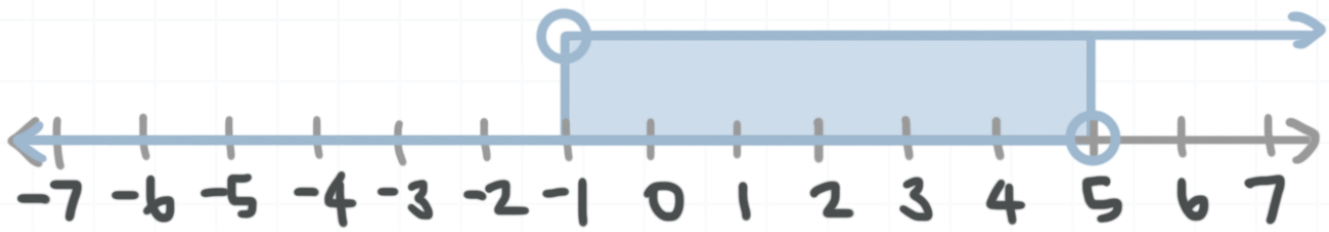


D

Solution: A

The solution of the conjunction $-1 < x < 5$ consists of all the numbers that are greater than -1 and less than 5.

Remember, $-1 < x$ is equivalent to $x > -1$, so the graph of the conjunction is the overlap of the graphs of the inequalities $x > -1$ and $x < 5$.



The shaded area shows the overlap, which is everything between -1 and 5. The overlap includes neither -1 nor 5, because there's an open circle at -1 on the graph of the inequality $x > -1$, and an open circle at 5 on the graph of the inequality $x < 5$.

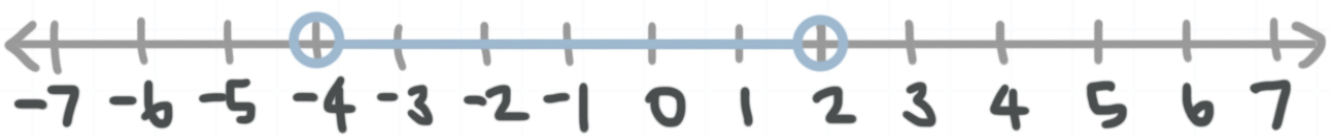
Topic: Graphing conjunctions on a number line

Question: Graph the conjunction $2 > x \geq -4$.

Answer choices:

A

B



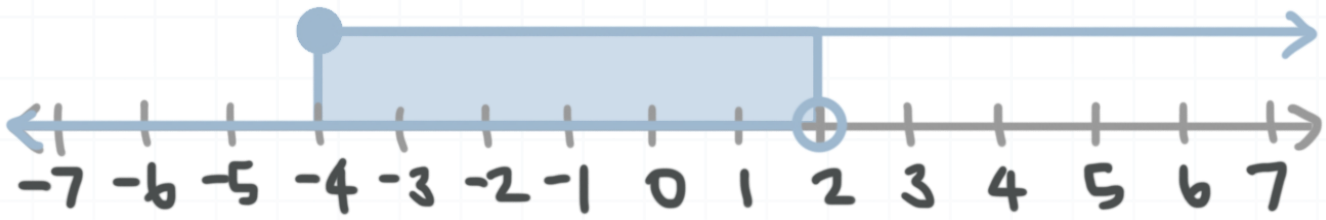
C

D

Solution: D

The conjunction $2 > x \geq -4$ can be thought of as the set of all x values that are greater than or equal to -4 and less than 2.

Remember, $2 > x$ is equivalent to $x < 2$, so in terms of graphing, that set would be the intersection (overlap) of $x \geq -4$ and $x < 2$.



The shaded area shows the overlap, which would be from -4 to 2, including -4, but not including 2.

Topic: Graphing conjunctions on a number line

Question: Graph the conjunction of the inequalities $-6x + 11 > -7$ and $5x - 6 \geq -26$.

Answer choices:

A

B

C

D

Solution: B

Before graphing the conjunction of the inequalities $-6x + 11 > -7$ and $5x - 6 \geq -26$, we need to solve the inequalities separately. Begin solving $-6x + 11 > -7$ by subtracting 11 from both sides.

$$-6x + 11 > -7$$

$$-6x + 11 - 11 > -7 - 11$$

$$-6x > -18$$

Since the coefficient of x is -6 (which is negative), we can't simply divide both sides by -6; we have to also change the direction of the inequality sign (at the same time that we do the division).

$$\frac{-6x}{-6} < \frac{-18}{-6}$$

$$x < 3$$

Begin solving $5x - 6 \geq -26$ by adding 6 to both sides.

$$5x - 6 \geq -26$$

$$5x - 6 + 6 \geq -26 + 6$$

$$5x \geq -20$$

Now divide both sides by 5.

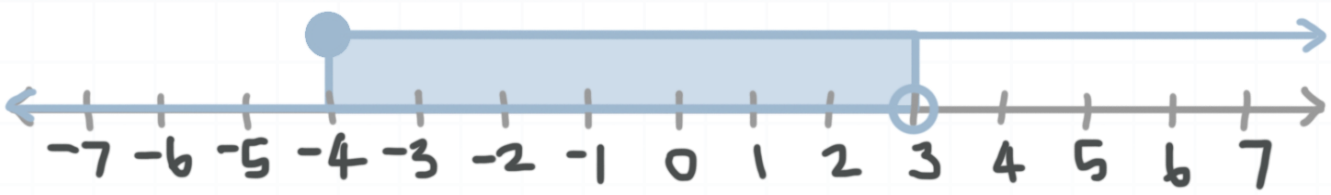
$$\frac{5x}{5} \geq \frac{-20}{5}$$

$$x \geq -4$$

Since the inequality $x \geq -4$ is equivalent to $-4 \leq x$, the conjunction of the inequalities $x \geq -4$ and $x < 3$ can be written as

$$-4 \leq x < 3$$

The solution of this conjunction consists of all the numbers that are greater than or equal to -4 and less than 3. The graph of the conjunction is the overlap of the graphs of the inequalities $x < 3$ and $x \geq -4$.



The overlap consists of an open circle at 3 (because there's an open circle at 3 on the graph of the inequality $x < 3$), a solid circle at -4 (because there's a solid circle at -4 on the graph of the inequality $x \geq -4$, and -4 is also on the graph of the inequality $x < 3$), and everything between -4 and 3.