## Solve the inequality

$3 - 2|a - 3| > -5$
$-3 \qquad\qquad -3$ To solve first you need to subtract 3 from both sides

For the next step most people's first instinct is to distribute the -2 into the absolute, but although absolute value is grouping symbols, you can never distribute into the absolute value bars.

So, the only other thing you can do is divide by -2 to both sides,

$\frac{-2|a - 3|}{-2} > \frac{-8}{-2}$

This is where the one rule for inequalities is used:
"If you every miltiply or divide by a negative number, then flip the inequality sign"

Flipped

$|a - 3| < 4$

Once the absolute value is isolated on one side always check for "no solution" and "all real solutions".
The alsolute value is not < or > a "negative number" so continue.

The absolute value is 4 units away from zero at "4" and "$-4$"
So write your two inequalities:
Remember to flip the inequality with the negative.

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Remove the absolute value bars:

$a - 3 < 4$ and $a - 3 > -4$ Then finish solving by adding 3 on both sides
$+3 \quad +3$ $+3 \quad +3$

Answer!
$a < 7$ and $a > -1$

# Graph the inequality

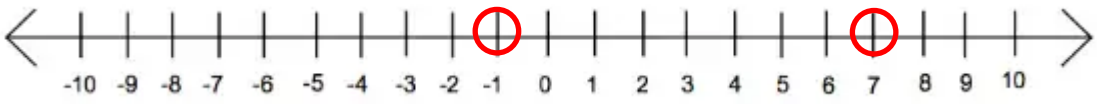
On a number line graph the answers:

The numbers used are 7 and $-1$ from the answers.

If the answer has $\leq$ or $\geq$ then use solid circles:

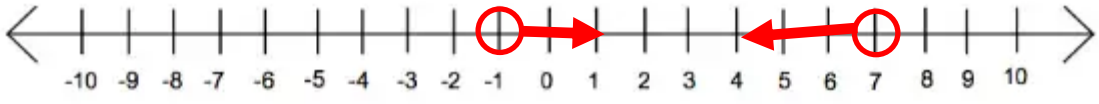
If the answer has $<$ or $>$ then use open circles:

So, use open circle to match your answer, put open circle on the 7 and $-1$

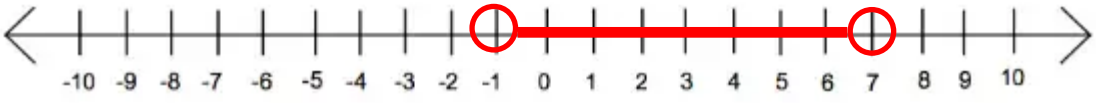



Next, put the arrows on the graph:
Make sure the variable is on the left, and treat the inequality sign as the arrow direction:

| | | |
|---|---|---|
| $a < 7$ | and | $a > -1$ |
| Go left | and | go right |




Since the arrows are going towards each other the connect the lines together




Graph done!

# Write the inequality as an interval notation

The numbers used are 7 and $-1$ and every number in between.

If the answer has $\leq$ or $\geq$ then use brackets: [ and ]

If the answer has $<$ or $>$ then use paratheses: ( and )

So, use paratheses to match your answer, put paratheses around the 7 and $-1$ and put the 7 and -1 in order as you see them on the number line.

Like so: $(7, -1)$

Done!