3.5 Compound Inequalities

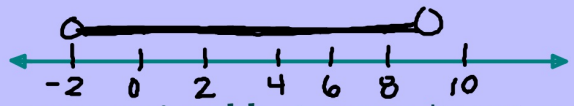
Two inequalities joined by the word <u>and</u> or the word <u>or</u> form a compound inequality.

There are two kinds of compound inequalities, conjunctions (and) and disjunctions (or).

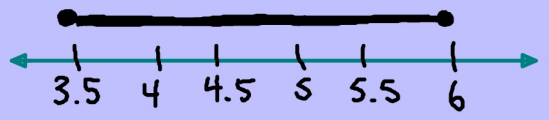
Write a compound inequality that represents each situation. Graph the solutions.

All real numbers greater than -2 but less than 9.

$-2 < x < 9$



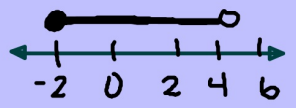
The books were priced between $3.50 and $6 inclusive. $3.50 \le x \le 6$



Solve the following compound inequalities. Graph the solutions.

$-\frac{6}{3} \leqslant \frac{3x}{3} < \frac{15}{3}$

$-2 \le x < 5$

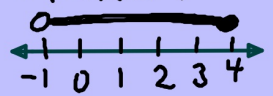


$-3 < 2x - 1 \leqslant 7$

$+1 \quad +1 \quad +1$

$-\frac{2}{2} < \frac{2}{2}x \leq \frac{8}{2}$

$-1 < x \le 4$



The acidity of the water in a swimming pool is considered to be normal if the average of three pH readings is between 7.2 and 7.8, inclusive. The first two readings are 7.4 and 7.9. What possible values for the third reading will make the average pH normal?

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D

$7.2 \le \frac{7.4 + 7.9 + x}{3} \le 7.8$

$\cdot 3 \qquad\qquad \cdot 3$

$21.6 \le 7.4 + 7.9 + x \le 23.4$

$21.6 \le 15.3 + x \le 23.4$

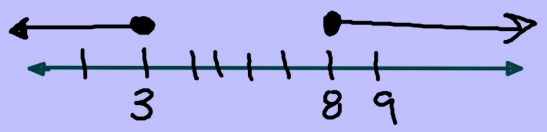
$-15.3 \quad -15.3 \quad -15.3$

$6.3 \le x \le 8.1$

Compound inequalities using or have solutions that make either inequality true. The shading on these graphs go away from each other.

Write a compound inequality and graph the solution.

All real numbers that are at most 3 or at least 8. $x \leq 3$ or $x \geq 8$



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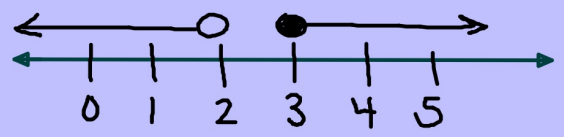
Solve the inequality $-2x + 7 > 3$ or $3x - 4 \geq 5$. Graph the solution.

$-7 \quad -7 \qquad +4 \quad +4$

$\frac{-2x}{-2} > \frac{-4}{-2} \qquad \frac{3x}{3} \geq \frac{9}{3}$

$x < 2$ or $x \geq 3$



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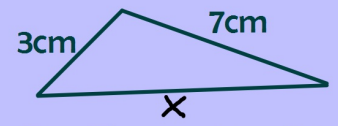
The Triangle Inequality Theorem:

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Use the triangle inequality statement above to find the possible lengths of the third side of this triangle.

x could be the longest side or 7cm could be longest side. Why not 3cm?



$x + 3 > 7$

$3 + 7 > x$

$10 > x$

$x + 3 > 7$

$-3 \quad -3$

$x > 4$

$4 < x < 10$

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