August 22, 2022

Inequalities + Absolute Value

$1 + 5(x-8) \leq 2 - (x+5)$

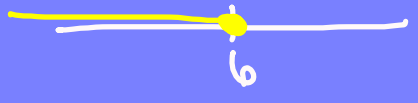
$1 + 5x - 40 \leq 2 - x - 5$

$5x - 39 \leq -3 - x$

$+x \quad +39 \qquad +39 \quad +x$

$\frac{6x}{6} \leq \frac{36}{6}$

$x \leq 6$



$2 \leq x$

$\leq$ ●

$<$ ○

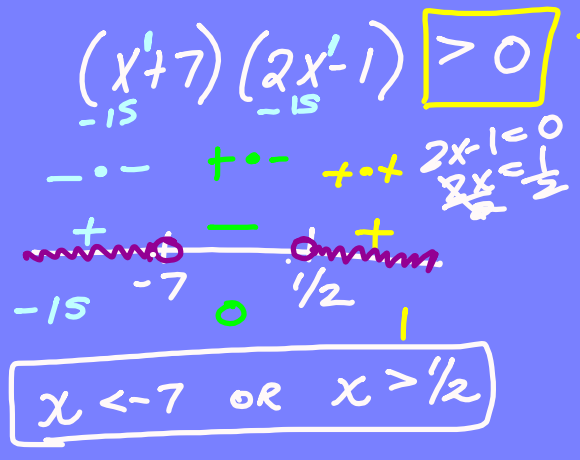
$\frac{-3x}{-3} < \frac{12}{-3}$

$x > -4$

$-1 \quad 2 < 7$

$-2 > -7$

$(x+7)(2x-1) > 0$



Testing Points

* Use if variables are multiplied or divided.

1) Find where each quantity $= 0$.
2) Test a point in each interval for + or −.
3) Shade the solutions using the inequality ≥ 0 +, ≤ 0 −
4) Determine open/closed circles
5) Write solution in symbols.

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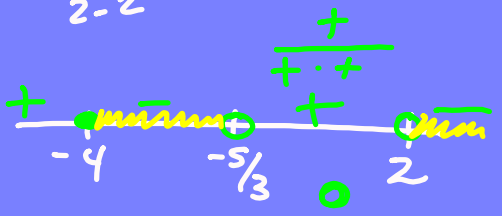
$$\frac{x+4}{(2-x)(3x+5)} \leq 0$$

$2-2$

$3x+5=0$

$3x=-5$

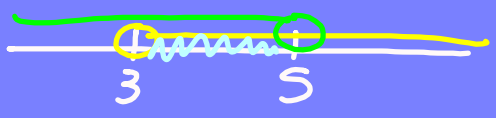
$x=-\frac{5}{3}$



$-4 \leq x < -5/3$ OR $x > 2$

Compound Sentences

$x > 3$ **and** $x < 5$



AND = intersection (overlap)

$3 < x < 5$

AND

$2m + 7 < 5m - 9 \leq 3m + 2$

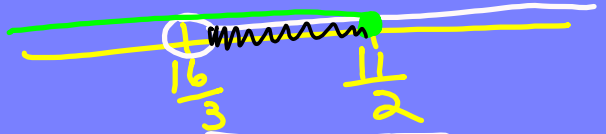
$2m + 7 < 5m - 9$ AND $5m - 9 \leq 3m + 2$

$-2m \quad +9 \quad -2m$ $\quad -3m \quad -3m$

$\frac{16}{3} < \frac{3m}{3}$ $\quad \frac{2m}{2} \leq \frac{11}{2}$

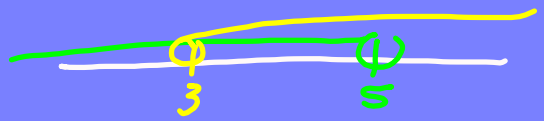
$\frac{16}{3} < m$ AND $m \leq 11/2$

$5\frac{1}{3}$ $\quad 5\frac{1}{2}$



$\frac{16}{3} < m \leq \frac{11}{2}$

$x > 3$ OR $x < 5$



$\mathbb{R}$

OR = anything shaded

$-3 \leq 2y + 9$ OR $18 - 4y > -10$

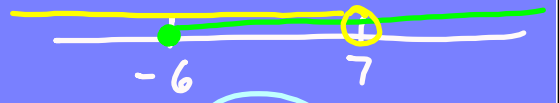
$-9 \quad -9 \quad -18$

$-12 \leq 2y$ $\quad -4y > -28$

$-6 \leq y$ $\quad \frac{-4y}{-4} > \frac{-28}{-4}$ switch

$y < 7$

Anything shaded → OR



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