

# Notes on Compound Inequalities

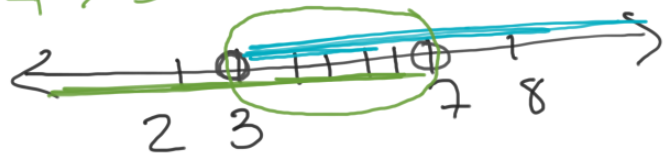
and = both must be true

or = either or / both can true

Ex.  $x > 3$  and  $x < 7$

$4 > 3 \checkmark$        $4 < 7 \checkmark$

$>$     $<$   
•



Ex.  $x < 3$  or  $x > 7$

$2 < 3 \checkmark$        $2 > 7 \times$



Solve for:  $3t + 2 < -7$

$$\begin{array}{r} \rightarrow 3t + 2 < -7 \\ \underline{-2 \quad -2} \end{array}$$

$$\frac{3t < -9}{3 \quad 3}$$

$$\boxed{t < -3}$$

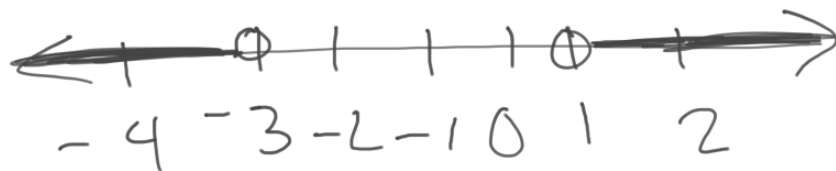
or  $-4t + 5 < 1$

$$\begin{array}{r} -4t + 5 < 1 \\ \underline{-5 \quad -5} \end{array}$$

$$\frac{-4t < -4}{\textcircled{-4} \quad \textcircled{-4}}$$

$$\boxed{t > 1}$$

$$\frac{\cancel{-4}}{\cancel{4}}$$



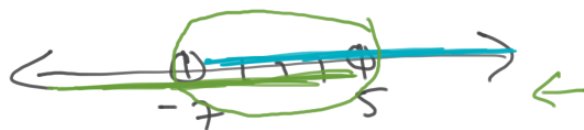
Solve for  $-4 < k+3 < 8$

$$\begin{array}{r} -4 < k+3 \\ -3 \quad -3 \\ \hline -7 < k \\ k > -7 \end{array}$$

and

$$\begin{array}{r} k+3 < 8 \\ -3 \quad -3 \\ \hline k < 5 \end{array}$$

$$-7 < k < 5$$



same

Solve for  $15 \leq \frac{20 + 11 + k}{3} \leq 19$

$\downarrow$   
 $3 \cdot 15 \leq \frac{20 + 11 + k}{3} \cdot 3$  and  $3 \cdot \frac{20 + 11 + k}{3} \leq 19 \cdot 3$

$45 \leq (20 + 11) + k$

$45 \leq 31 + k$

$-31 \quad -31$   


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$14 \leq k$

$k \geq 14$

$14 \leq k \leq 26$

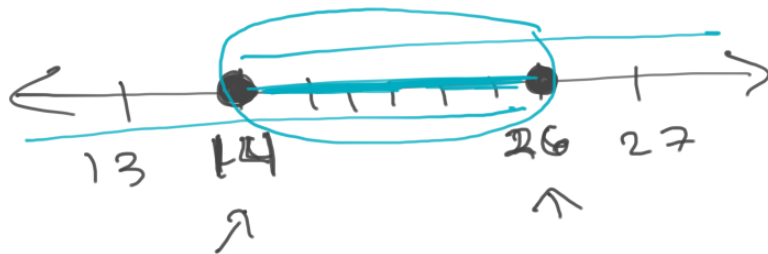
$(20 + 11) + k \leq 57$

$31 + k \leq 57$

$-31 \quad -31$   


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$k \leq 26$



Solve for  $\frac{4y+2}{5} - 5 > 3$  or  $\frac{4-3y}{6} > 4$

$$\frac{4y+2}{5} - 5 + 5 > 3 + 5$$

$$5 \cdot \frac{4y+2}{5} > 8 \cdot 5$$

$$4y+2 > 40$$

$$+2 \quad -2$$

$$4y > \frac{38}{4}$$

$$y > 9.5$$

or  $\frac{4-3y}{6} > 4 \cdot 6$

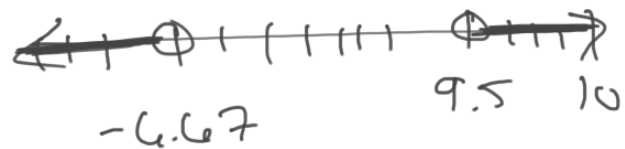
$$4-3y > 24$$

$$-4 \quad -4$$

$$-3y > 20$$

$$-3 \quad -3$$

$$y < -6.67$$



①  $-4 > y + 2 > -10$

$$\begin{array}{r} -4 > y + 2 \\ -2 \quad \quad \quad / 2 \end{array}$$

$$\boxed{-6 > y}$$

and  $y + 2 > -10$

$$\begin{array}{r} y + 2 > -10 \\ \quad \quad \quad / -2 \end{array}$$

$$\boxed{y > -12}$$

$$\boxed{-6 > y = y < -4}$$

