

第九章 不等式

≠不等于

>大于

<小于

≤小于或等于

≥大于或等于

注意：两边加减乘除同一正数，不等号方向不变

两边数“乘”或“除”负数，不等号方向改变

例子

$$\begin{aligned}5(6-y)+1 &< y+1 \\&= 36-5y+1 < y+1 \\&= 31-1 < y+5y \\&= 30 < 6y \\&= \frac{30}{6} < y \\&= 5 < y\end{aligned}$$

例子

$$\begin{aligned}\frac{1}{6}(2-x)-3 &\geq \frac{x}{10} \\&= \frac{2}{6}-\frac{x}{6}-3 \geq \frac{x}{10} \\&= \frac{2-x-18}{6} \geq \frac{x}{10}\end{aligned}$$

$$\begin{aligned}&= \frac{-16-x}{6} \geq \frac{x}{10} \\&= 10(-16-x) \geq 6x \\&= -160-10x \geq 6x \\&= -160 \geq 6x \\&= -10 \geq x\end{aligned}$$

例子

$$\begin{cases}x-3 \leq \frac{1}{2}(x-4) \\ \frac{1}{4} + (x-\frac{9}{4}) \geq \frac{x}{2}\end{cases}$$

$$\begin{aligned}x-3 &\leq \frac{1}{2}(x-4) \\&= x-3 < \frac{x}{2}-2 \\&= x-\frac{x}{2} < 2+3 \\&= \frac{1}{2}x < 1 \\&= x < 2\end{aligned}$$

$$\begin{aligned}\frac{1}{4} + (x-\frac{9}{4}) &\geq \frac{x}{2} \\&= \frac{1}{4} + \frac{4x-9}{4} \geq (\frac{x}{2}) \times 2 \\&= 1+4x-9 \geq 2x \\&= -8 \geq -2x \\&= \frac{-8}{-2} \leq x \\&= 4 \leq x\end{aligned}$$

练习

1	$\begin{cases} x - \frac{x}{2} > \frac{x+1}{3} \\ x < 1 + \frac{x+8}{6} \end{cases}$	2	$\begin{cases} \frac{7-x}{2} - 3 > \frac{3x+4}{5} \\ \frac{2x-1}{5} > 2(x+1) \end{cases}$
3	$\begin{cases} 2(1-x) > x-1 \\ x-1 > \frac{1}{2}(x-7) \end{cases}$	4	$\begin{cases} x-3 < \frac{1}{2}(x-4) \\ \frac{1}{4} + \left(x - \frac{9}{4}\right) \geq \frac{x}{2} \end{cases}$
5	$\begin{cases} \frac{x-2}{4} > \frac{x-1}{6} \\ \frac{x+1}{3} - \frac{x-1}{2} < 1 \end{cases}$	6	$\begin{cases} 10-6x < 5+2x \\ \frac{x+1}{5} - x \geq 2x-12 \end{cases}$
7	$\begin{cases} x-2(x+3) \leq 0 \\ 2x+1 \leq \frac{5x-14}{4} \end{cases}$	8	$\begin{cases} \frac{1}{2}(x+2) < \frac{1}{5}(x-4) \\ \frac{2x}{3} + 1 \geq x - \frac{1}{2} \end{cases}$
9	$\begin{cases} 3x+3 < x+7 \\ x+10 > 4-x \end{cases}$	10	$-1 \leq \frac{3-2x}{5} < 1$
11	$-4 < \frac{1}{2}x - 3 < 1$	12	$-4 < 2x - 1 \leq 3$
13	$\frac{y+1}{3} - \frac{y-1}{2} \geq \frac{y}{6}$	14	$\frac{x+5}{2} - 1 < \frac{3x+2}{2}$
15	$10-4(x-3) \leq 2(x-1)$	16	$5x < 2[(x+5) + 3(x-5)] + 5(x+4)$
17	$5x-9(x-1) \geq 3x+5$	18	$x - \frac{1}{3}(x-4) > \frac{4}{15}(3x+4)$
19	$3[x-2(x-1)] < 4x-1$	20	$\begin{cases} 5x-2 > 3(x+1) \\ \frac{1}{2}x-1 \leq 7 - \frac{3}{2}x \end{cases}$