SIMPLE LINEAR INEQUALITIES

Solve each inequality and show the solution on a number line.

5 $3x > 2x + 12$ 6 $3(x+1) \geq 9$ 7 $7x < 3(2x+1)$ 8 $-3x + 2 < 29$

⑤ $3x > 2x + 12$

$\Leftrightarrow x > 12$

⑥ $3(x+1) \geq 9$

$\Leftrightarrow 3x + 3 \geq 9$

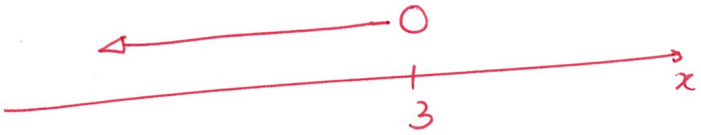
$\Leftrightarrow 3x \geq 6$

$\Leftrightarrow x \geq 2$

⑦ $7x < 3(2x+1)$

$\Leftrightarrow 7x < 6x + 3$

$\Leftrightarrow x < 3$



⑧ $-3x + 2 < 29$

$\Leftrightarrow -3x < 27$

$\Leftrightarrow x > -\frac{27}{3}$

$\Leftrightarrow x > -9$

SIMPLE LINEAR INEQUALITIES

Solve each inequality

17 $\frac{3x}{5}-\frac{2x}{3}>-2$ 18 $\frac{7x}{3}<3+\frac{4x}{3}$ 19 $\frac{x-5}{2}>\frac{5x-3}{6}$ 20 $\frac{5x-3}{2}<x+2$

(17) $\frac{3x}{5}-\frac{2x}{3}>-2 \iff \frac{9x-10x}{15}>-2$

$\iff -\frac{x}{15}>-2 \iff -x>-30$

$\iff x<30$

(18) $\frac{7x}{3}-\frac{4x}{3}<3 \iff \frac{3x}{3}<3 \iff x<3$

(19) $\frac{x-5}{2}>\frac{5x-3}{6} \iff 6(x-5)>2(5x-3)$

$\iff 6x-30>10x-6$

$\iff -24>4x$

$\iff x<-6$

(20) $\frac{5x-3}{2}<x+2 \iff 5x-3<2(x+2)$

$\iff 5x-3<2x+4$

$\iff 3x<7$

$\iff x<7/3$

SIMPLE LINEAR INEQUALITIES

24 Solve simultaneously $x - 2 > -2$ and $x - 3 \leq 0$. Indicate whether each answer is correct or incorrect.

(a) $0 \leq x \leq 3$ **(b)** $0 < x \leq 3$ **(c)** $0 \leq x \leq 3$ **(d)** $x > 0$ or $x \leq 3$

$x - 2 > -2 \iff x > 0$

$x - 3 \leq 0 \iff x \leq 3$

So $\therefore \quad 0 < x \leq 3$

26 If a certain number is divided by 2, the result is greater than 4 but less than 8. What values can this number take?

$4 < \frac{x}{2} < 8$

$\iff 8 < x < 16$

27 The sum of two consecutive positive integers is no more than 35. What are the possible values of these integers?

$n + (n+1) \leq 35$

$\iff 2n + 1 \leq 35$

$\iff 2n \leq 34$

$\iff n \leq 17$

So n can take all values less than or equal to 17

SIMPLE LINEAR INEQUALITIES

28 A committee consists of 3 more women than men. The total number of committee members is at least 7 but not more than 15. How many women could be on the committee?

$w = m + 3$ so $m = w - 3$

$15 \geqslant w + m \geqslant 7$ or $7 \leqslant w + m \leqslant 15$

so $7 \leqslant w + (w-3) \leqslant 15$

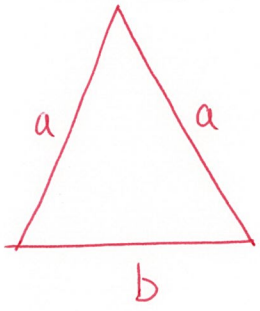
$\Leftrightarrow \quad 7 \leqslant 2w - 3 \leqslant 15$

$\Leftrightarrow \quad 10 \leqslant 2w \leqslant 18$

$\Leftrightarrow \quad 5 \leqslant w \leqslant 9$

So there could be 5, 6, 7, 8 or 9 women

30 The base length of an isosceles triangle is an integer (in cm) and is 4 cm less than the sum of the two equal sides. The perimeter is an integer (in cm) less than 80 cm. What are the possible base lengths?



$2a - 4 = b$ so $a = \frac{b+4}{2}$

$2a + b < 80$

$\Leftrightarrow \quad b + 4 + b < 80$

$\Leftrightarrow \quad 2b + 4 < 80$

$\Leftrightarrow \quad 2b < 76$

$\Leftrightarrow \quad b < 38$