

**Linear Inequalities – www.m4ths.com – Steve!**

(1) Which ONE of the following inequalities is wrong?

$3 < 7$        $4 > 2$        $8 < 9$        $11 < 10$

(2) Use an inequality symbol between the pairs of numbers below to make a correct statement.

(a) 5    8      (b) -4    0      (c) 12    1

(2) List **any 3 integers** that satisfy each inequality below:

(a)  $x > 5$       (b)  $x < 10$       (c)  $x \geq 9$   
 (d)  $x \leq 8$       (e)  $x > -4$       (f)  $x \geq 3.9$

(3) Circle the values below that do **NOT** satisfy the inequality  $x > -5$

$x = 4$        $x = -6$        $x = -5$        $x = 10$

(4) List **ALL the integers** that satisfy each inequality below:

(a)  $4 < x \leq 9$       (b)  $3 \leq x < 7$   
 (c)  $10 < x < 11$       (d)  $1.8 < x \leq 9.2$   
 (e)  $-5 < x < 2$       (f)  $10 < 2x < 21$

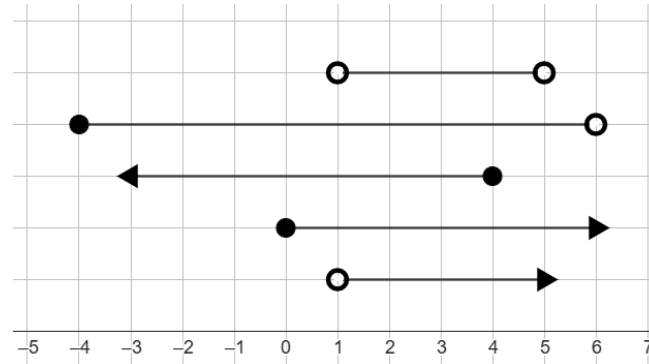
(5) Given that exactly 8 integers satisfy the inequality  $3 < x \leq a$ , write down a **possible value** of  $a$ .

(6) Write down the largest possible integer value of  $p$  that satisfies the inequality  $10 < 4p \leq 21$

(7) Place any mathematical symbols in the boxes below to make the inequality true:

$5 \square 3 \square 7 > 22$

(8) Write down the inequality shown on each number line below. Use  $x$  as the letter in the inequality.



(9) Represent each of the following inequalities in  $x$  on a number line:

(a)  $x < 10$       (b)  $x \geq 5$       (c)  $x < -3$   
 (d)  $5 < x \leq 8$       (e)  $-2 \leq x \leq 4$       (f)  $x > -1$   
 (g)  $12 < 3x < 18$       (h)  $-10 > 2x$       (i)  $3 \geq 0.5x$

(10) Solve each of the inequalities (or inequations) below:

(a)  $5x > 10$       (b)  $4x < 20$       (c)  $12x \leq 6$   
 (d)  $2x - 3 > 9$       (e)  $7x + 8 \leq 57$       (f)  $\frac{1}{3}x > 4$

(11) Solve each of the inequalities (or inequations) below:

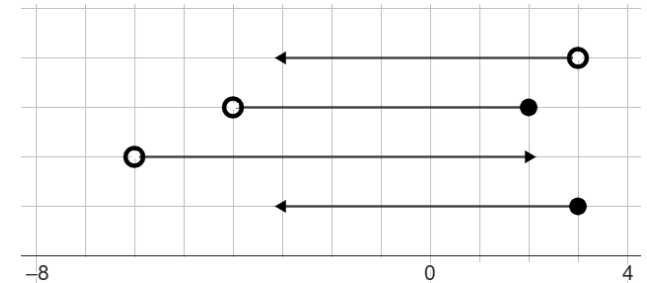
(a)  $3x \leq 2x + 10$       (b)  $5x - 3 > 2x + 9$   
 (c)  $10 - x \geq 4x + 5$       (d)  $3(4x - 1) > x + 1$

(12)\* Solve each inequality below:

(a)  $-4x > 12$       (b)  $-6x < 24$       (c)  $-3x \geq -15$

(13)\* Given that the greatest integer that satisfies  $-ax \geq 30$  is  $-7$ , find the value of  $a$ .

(14) How many integers satisfy **ALL** the inequalities shown below.



(15) On a fairground ride the rider has to be between  $90\text{cm}$  and  $1.9\text{m}$  in height. Using  $(h)$  for height, write an inequality to represent the range of heights the rider can take.

(16)  $x$ ,  $y$  and  $z$  are positive numbers. Given that  $x + y > z$ , complete the 'statement' table below

Statement	True	False	Could be True
$x + y \geq z$			
$x + y - z > 0$			
$z < x < y$			
$x - y \geq z$			
$y + z > x$			

(17)\* A rectangle has sides lengths  $a$  and  $b$  where  $a$  and  $b$  are integers.

Given that the area of the rectangle is greater than 48 and the perimeter is greater than 28:

(a) Write down two different inequalities involving  $a$  and  $b$  giving each in their simplest form.

(b) Given further that  $b < a$ , find the least possible value of  $a$

(c)\*\*\* Given in fact the perimeter is exactly 36 **AND** the area is greater than 48, show that  $b^2 - 18b + 48 < 0$