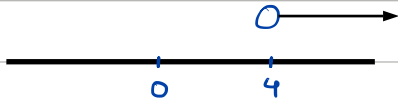


Inequalities

→ Solving inequalities

$$\textcircled{1} \quad x - 3 > 1$$

$$x > 4$$



Solution represented
On a number line.

$>$ Greater than

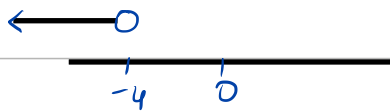
$<$ lesser than

\geq Greater than or equal to

\leq Lesser than or equal to

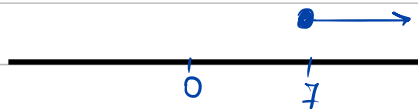
$$\textcircled{2} \quad x - 1 < -5$$

$$x < -4$$



$$\textcircled{3} \quad x - 3 \geq 4$$

$$x \geq 7$$



$$\textcircled{4} \quad 4 - x > 9$$

$$-x > 9 - 4$$

$$-x > 5$$

$$x > -5 \quad \times$$

$$\overset{x-1}{-x} > \overset{x-1}{5}$$

$$x < -5 \quad \checkmark$$

Note: Whenever both sides of an inequality are multiplied by '-', the sign flips

$$\textcircled{1} \quad 3 > -2$$

$$-3 < 2$$

$$\textcircled{2} \quad -4 > -5$$

$$4 < 5$$

3. Solve the inequality $7 + 2x \leq 16$ and illustrate the solution on a number line.

- (i) If x is an integer, write down the largest possible value of x that satisfies the inequality.
- (ii) Given that x is a perfect square, find the largest possible value of x .

$$7 + 2x \leq 16$$

$$2x \leq 16 - 7$$

$$x \leq 4.5$$

(i)

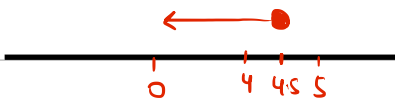
$$x \leq 4.5$$

(ii)

$$x \leq 4.5$$

$$x = 4$$

$$x = 4$$



4. Solve the inequality $3 - 4x > 3x - 18$ and illustrate the solution on a number line.

- (i) If x is a prime number, write down the possible value(s) of x that satisfies the inequality.
- (ii) Does $x = 0$ satisfy the inequality? Explain your answer.

$$3 - 4x > 3x - 18$$

$$-4x - 3x > -18 - 3$$

$$-7x > -21$$

$$7x < 21$$

$$x < 3$$

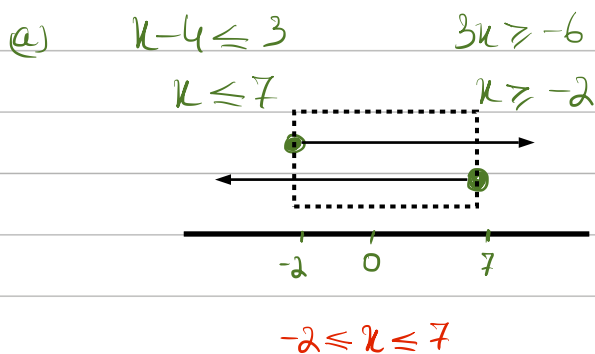
(i) 2

(ii) Yes, 0 is less than 3.

3. Find the range of values of x which satisfy each of the following pairs of inequalities.

(a) $x - 4 \leq 3$ and $3x \geq -6$

(b) $2x + 5 < 15$ and $3x - 2 > -6$



b. $-\frac{4}{3} < x < 5$

4. Find the integer values of x which satisfy each of the following pairs of inequalities.

(a) $5x - 1 < 4$ and $3x + 5 \geq x + 1$

$5x < 5$
 $x < 1$

(b) $2x - 5 \geq 1$ and $3x - 1 < 26$

$2x \geq 6$
 $x \geq 3$

b $2x - 5 \geq 1$ $3x - 1 < 26$

$2x \geq 6$ $3x < 27$

$x \geq 3$ $x < 9$

a. $-2 \leq x < 1$

$-2, -1, 0$

$3 \leq x < 9$

$3, 4, 5, 6, 7, 8$

5. Solve each of the following pairs of inequalities, illustrating each solution on a number line.

(a) $-4 \leq 2x \leq 3x - 2$

(b) $1 - x < -2 \leq 3 - x$

(c) $3x - 3 < x - 9 < 2x$

(d) $2x \leq x + 6 < 3x + 5$

Make pairs

$3 > 1$

$1 < 3$

(a).

$-4 \leq 2x$ OR $2x \geq -4$

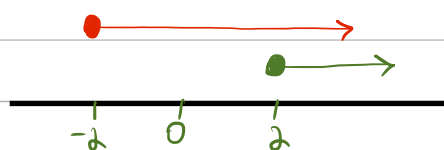
$2x \leq 3x - 2$

$-2 \leq x$

$x \geq -2$

$-x \leq -2$

$x \geq 2$



$x \geq -2$

$-2, -1, 0, 1, 2, 3, 4, 5$

$x \geq 2$

$2, 3, 4, 5$

$x \geq 2$

(c)

$3x - 3 < x - 9 < 2x$

$3x - 3 < x - 9$

$x - 9 < 2x$

$2x < -6$

$x - 2x < 9$

$x < -3$

$-x < 9$

$x > -9$

$-9 < x < -3$

d.

$2x \leq x + 6 < 3x + 5$

$2x \leq x + 6$

$x + 6 < 3x + 5$

$x \leq 6$

$x - 3x < 5 - 6$

$-2x < -1$

$2x > 1$

$x > \frac{1}{2}$

$\frac{1}{2} < x \leq 6$

13. Solve each of the following pairs of inequalities.

(a) $3 - a \leq a - 4 \leq 9 - 2a$

(b) $1 - b < b - 1 < 11 - 2b$

(c) $3 - c < 2c - 1 < 5 + c$

(d) $3d - 5 < d + 1 \leq 2d + 1$

4. (a) Write down all the integer values of n for which $-2 \leq n < 4$.
 (b) Find the least integer value of x for which $3 - x < 2$.

5. (a) Solve the inequality $-5 < 2x + 3 < 1$.
 (b) Write down the largest integer, x , which satisfies $-5 < 2x + 3 < 1$.

4. (a) $-2 \leq n < 4$
 $n = -2, -1, 0, 1, 2, 3$

(b) $3 - x < 2$
 $-x < 2 - 3$
 $-x < -1$
 $x > 1$
 $x = 2$

(a) $-5 < 2x + 3 < 1$
 $\frac{-8}{2} < \frac{2x}{2} < \frac{-2}{2}$
 $-4 < x < -1$
 $x = -3, -2$

$x = -2$

40. a, b, c, d and e are five numbers, such that

$$d < a < c$$

$$a < e < c$$

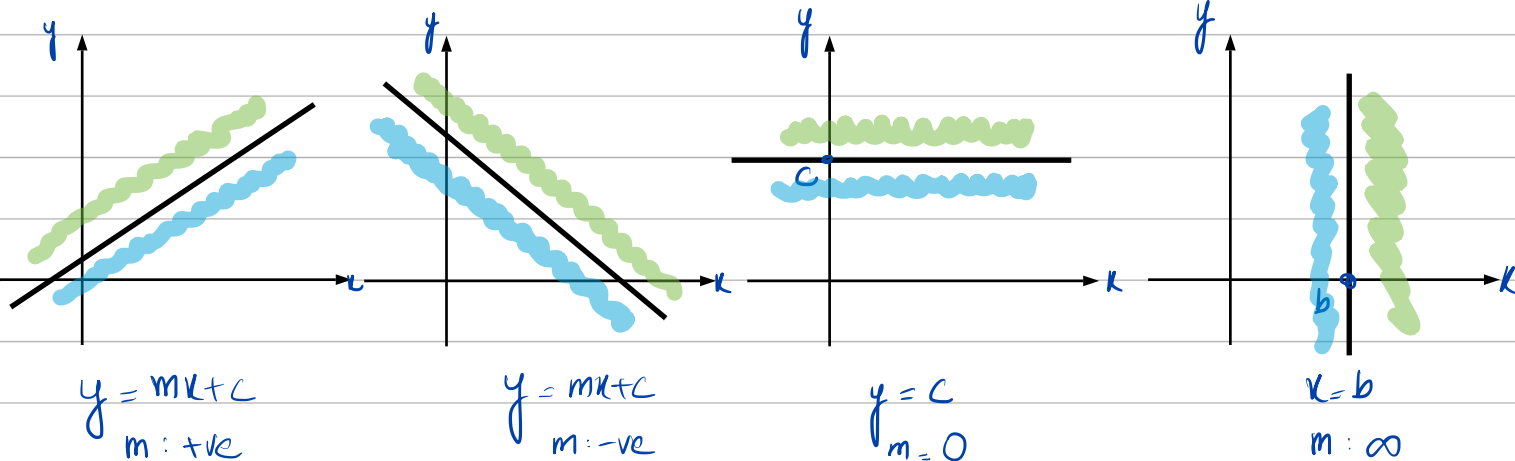
$$a < b < e$$

Arrange these numbers in order, starting with the smallest.

$$d < a < b < e < c$$

$$d < a < b < e < c$$

→ Graphs of inequalities



Greater — $y > mx + c$
 Lesser — $y < mx + c$

Greater — $y > mx + c$
 Lesser — $y < mx + c$

Greater — $y > c$
 Lesser — $y < c$

Greater — $x > b$
 Lesser — $x < b$

Solid line :

\geq, \leq

Dotted line
or

$>, <$

Inside the region, but
line is solid