EXAM PAPERS PRACTICE

GCSE OCR Math J560

Inequalities

Answers

"We will help you to achieve A Star "

Answer 1

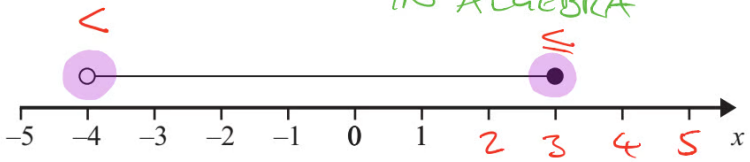
INEQUALITIES

$\leqslant$ "LESS THAN OR EQUAL TO" ●

$<$ "LESS THAN" ○

IN ALGEBRA ↑ ON NUMBER LINE ↑

(b)



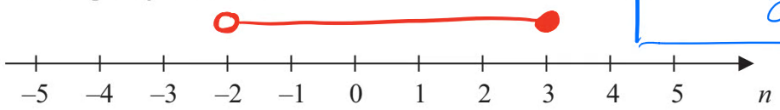
Write down the inequality shown in the diagram.

$-4 < x \leqslant 3$

Answer 2

$-2 < n \leqslant 3$

(a) Represent this inequality on the number line.



INEQUALITIES

$<$ "LESS THAN" ○

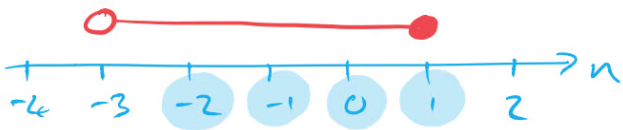
$\leqslant$ "LESS THAN OR EQUAL TO" ●

Answer 3

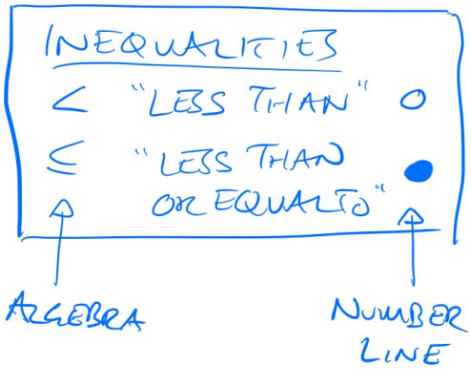
$-3 < n \leqslant 1$

n is an integer. "WHOLE NUMBER"

(a) Write down all the possible values of n.



$-2, -1, 0, 1$

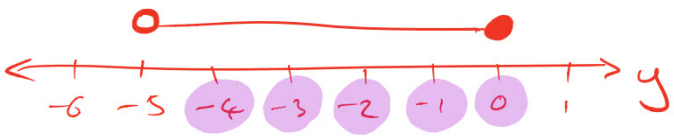


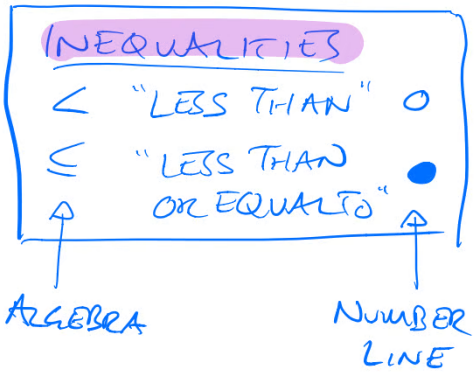
Answer 4

$-5 < y \leqslant 0$

y is an integer. WHOLE NUMBER

(a) Write down all the possible values of y.





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

Answer 5

Solve $3x - 5 < 16$

$3x - 5 < 16$

$+5 \quad +5$

$\frac{3x}{3} < \frac{21}{3}$

$x < 7$

Answer 6

(b) Solve the inequality $4x - 7 \geqslant 13$

$4x - 7 \geqslant 13$

$+7 \quad +7$

$\frac{4x}{4} \geqslant \frac{20}{4}$

$x \geqslant 5$

Answer 7

(b) Solve $7x - 9 < 3x + 4$

$7x - 9 < 3x + 4$

$-3x \qquad -3x$

$4x - 9 < 4$

$+9 \qquad +9$

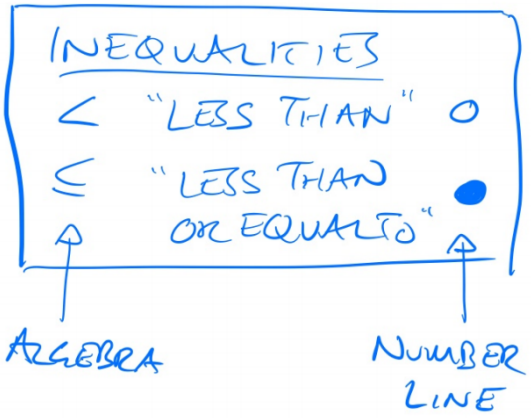
$\frac{4x}{4} < \frac{13}{4}$

$x < \frac{13}{4}$

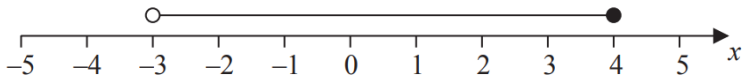
or $x < 3.25$

$x < 3.25$

Answer 8



(b) Here is an inequality, in x, shown on a number line.



Write down the inequality.

$-3 < x \leq 4$

Answer 9

WHOLE NUMBER

n is an integer with $-5 < 2n \leqslant 6$

Write down all the values of n

$$\frac{-5}{2} < \frac{2n}{2} \leqslant \frac{6}{2}$$

$$-2.5 < n \leqslant 3$$

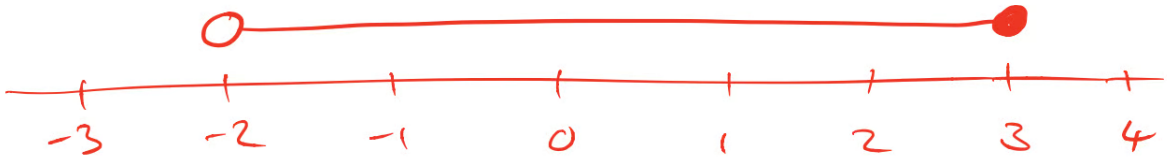
n COULD BE $-2, -1, 0, 1, 2, 3$

Answer 10

WHOLE NUMBER

m is an integer such that $-2 < m \leqslant 3$

(a) Write down all the possible values of m.



$-1, 0, 1, 2, 3$

Answer 11

GREATER THAN

(a) Solve the inequality $6y + 5 > 8$

$-5 \quad -5$

$\frac{6y}{6} > \frac{3}{6}$

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

Answer 12

IS GREATER THAN

Solve $6x + 4 > x + 17$

$-x \quad -x$

$5x + 4 > 17$

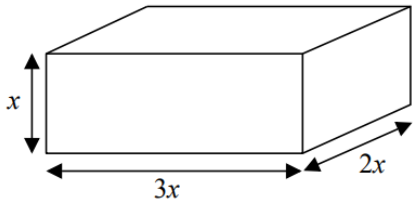
$-4 \quad -4$

$\frac{5x}{5} > \frac{13}{5}$

$x > \frac{13}{5}$ OR $x > 2.6$

Answer 13

Here is a cuboid.

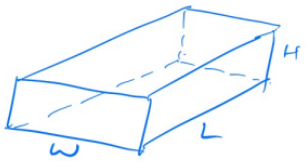


All measurements are in centimetres.
x is an integer. → WHOLE NUMBER
The total volume of the cuboid is less than 900 cm^3

Show that $x \leqslant 5$

CUBOID

$V = L \times W \times H$



VOLUME < 900

$3x \times 2x \times x < 900$

$\frac{6x^3}{6} < \frac{900}{6}$

$x^3 < \frac{3 \times 300}{3 \times 2}$ (300 → 150; 3×2 → 1)

$x^3 < 150$

CUBES

$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$
$6^3 = 216$

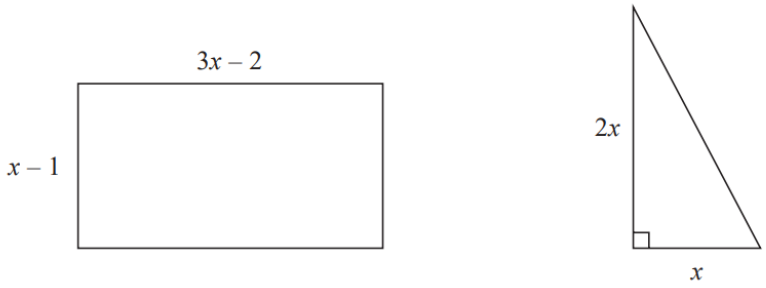
x IS BETWEEN 5 AND 6

SO x, BEING AN INTEGER CAN BE AT MOST 5

$x \leqslant 5$

Answer 14

Here is a rectangle and a right-angled triangle.

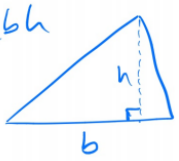


All measurements are in centimetres.
The area of the rectangle is greater than the area of the triangle.

Find the set of possible values of x.

AREA OF TRIANGLE

$A = \frac{1}{2}bh$

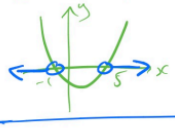


QUADRATIC INEQUALITIES

ALWAYS
- FACTORISE
- SKETCH A GRAPH
- USE x-AXIS AS A NUMBER LINE

eg $x^2 - 4x - 5 > 0$

$(x+1)(x-5) > 0$



→ $x < -1$ OR $x > 5$

AREA OF $\square$ > AREA OF Δ

$(x-1)(3x-2) > \frac{1}{2} \times x \times 2x$

F O I L

$3x^2 - 2x - 3x + 2 > x^2$

$3x^2 - 5x + 2 > x^2$

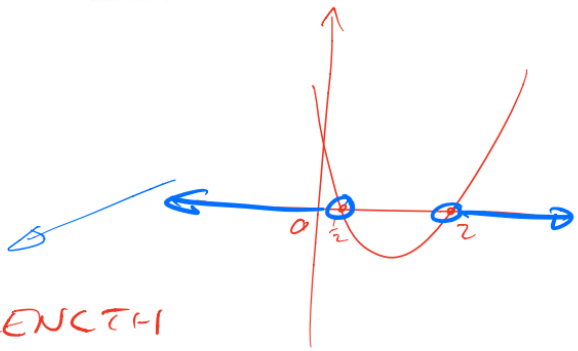
$-x^2 \qquad -x^2$

$2x^2 - 5x + 2 > 0$

$(2x-1)(x-2) > 0$

ROOTS: $x = \frac{1}{2}$ $x = 2$

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



BUT SINCE $x - 1$ IS A LENGTH

$x > 1$ SO WE IGNORE $x < \frac{1}{2}$

SO $x > 2$

Answer 15

Solve $x^2 > 3x + 4$

TREAT LIKE A QUADRATIC EQUATION:

$x^2 > 3x + 4$

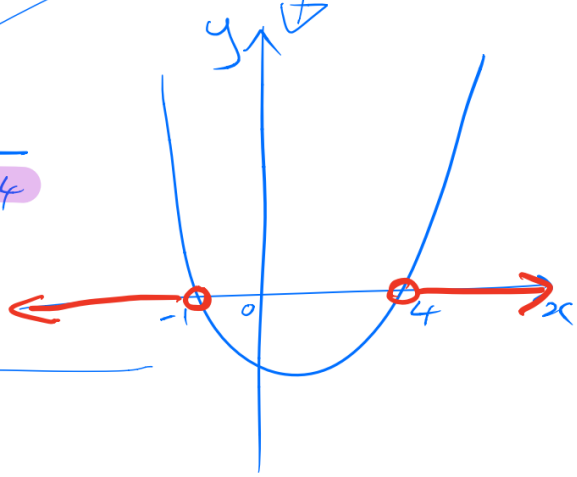
$-3x - 4 \quad -3x \quad -4$

$x^2 - 3x - 4 > 0$

$(x + 1)(x - 4) > 0$

$x < -1$ OR $x > 4$

SKETCH $y = (x+1)(x-4)$



-4

1×-4