

# GCSE MATHEMATICS

# Inequalities 1



**AQA**  These questions have been taken or modified from previous AQA GCSE Mathematics Papers.

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## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer all questions.
- You must answer the questions in the spaces provided.
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.14 unless another value is given in the question.

## Information

- The marks for questions are shown in brackets.
- The quality of your written communication is specifically assessed in questions that are indicated with an asterisk (\*).

## Advice

- Read each question carefully before you start to answer it.
  - In all calculations, show clearly how you work out your answer.
  - Use the number of marks for the question as a guide to the amount of time you need to spend.
  - Look at previous parts of the question, e.g. a), b), c) i) as there may be information there you need to answer later parts.
  - Check your answer is realistic and appropriate.
  - For calculator decimal numbers always write your full calculator display in the working out area and then, if you need to, round the answer on the answer line.
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This booklet was curated and modified using AQA examination papers between 2010-2016, for [thecalculatorguide.com](http://thecalculatorguide.com), where you can find many more booklets on further topics. All questions used are reproduced for educational purposes only.



[www.thecalculatorguide.com](http://www.thecalculatorguide.com)

1 (a) Write down **all** the integers that satisfy  $-3 \leq n < 2$

[1 mark]

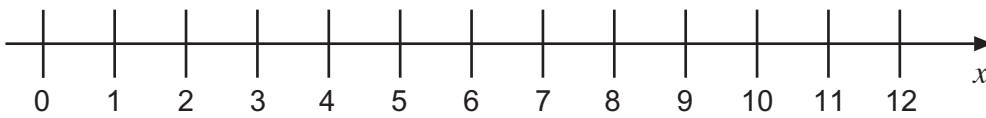
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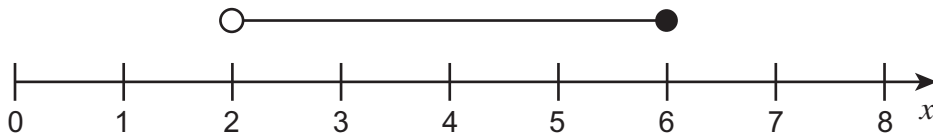
Answer \_\_\_\_\_

1 (b) Show  $2 < x \leq 10$  on the number line.

[2 marks]



2 (a) Circle the inequality shown by the diagram.



$2 < x < 6$

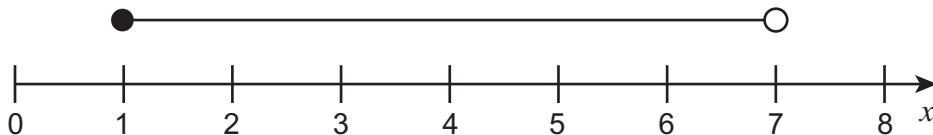
$2 \leq x < 6$

$2 < x \leq 6$

$2 \leq x \leq 6$

(1 mark)

2 (b) Write down the integer values satisfied by this diagram.



Answer .....

(2 marks)

**\*3 (a)** Show the inequality  $x > -2$  on the number line.



(1 mark)

**3 (b)** Solve the inequality  $3x + 5 \leq 11$

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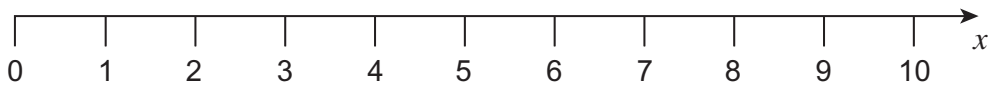
Answer ..... (2 marks)

**4 (a)** Solve  $4x - 7 \leq 13$

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Answer ..... (2 marks)

**4 (b)** Show  $3 < x \leq 8$  on the number line.



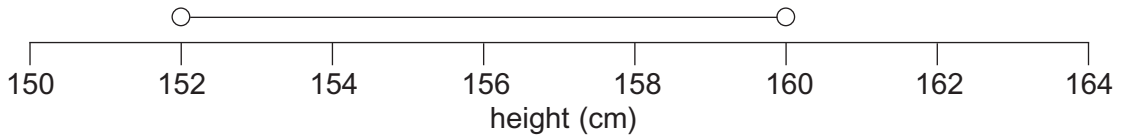
(2 marks)

- \*5 (a) (i)** Jake is exactly 160 centimetres tall.  
 Sam is exactly 135 centimetres tall.  
 Reanne is shorter than Jake but taller than Sam.

Write an inequality for Reanne's height,  $h$ .  
 You **must** use all the information given.

Answer ..... (2 marks)

- 5 (a) (ii)** Kia's height is in the range shown on the number line.



Kia is five centimetres shorter than Reanne.

Write down a possible height for Kia.

.....

Answer ..... cm (1 mark)

- 5 (b)** Sita's mum is twice as tall as Sita.  
 Sita's dad is eight centimetres taller than her mum.  
 The total of their three heights is 423 centimetres.

How tall is Sita?

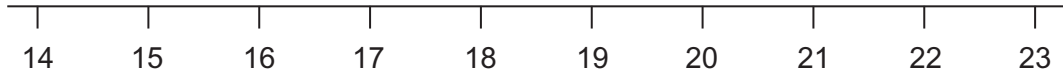
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Answer ..... cm (3 marks)

**6** One evening Anna, Dave and Tia were waiting for different buses.  
Anna waited for 22 minutes.

**\*6 (a)** Dave waited for more than 15 minutes but for less time than Anna.  
Show Dave's possible waiting times on the number line.

**[2 marks]**



**6 (b)** Tia waited for  $x$  minutes.  
She waited longer than Anna but no more than 25 minutes.

Show her possible waiting times as an inequality.

**[2 marks]**

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Answer .....

**7**  $x$  is greater than  $-3$  and less than  $5$

**7 (a)** Write the information as a single inequality.

**[2 marks]**

Answer .....

**7 (b)** Work out all the possible **integer** values of  $\frac{x}{2}$

**[2 marks]**

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Answer .....

8 (a) Solve  $5x - 11 \geq 29$

[2 marks]

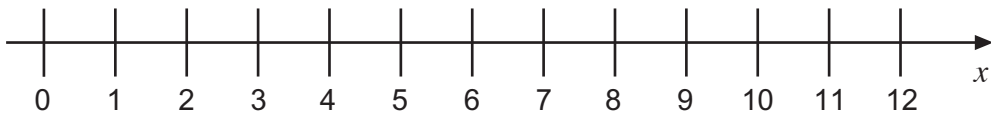
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Answer .....

8 (b) Show the solution of  $3x < 12$  on the number line.

[2 marks]

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9 (a) Solve  $6x - 5 > 2x + 7$

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Answer ..... (2 marks)

9 (b) Write down the smallest integer value of  $n$  which satisfies  $n > -1.2$

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Answer ..... (1 mark)

**10**  $x$  is an integer.

$$4x - 3 \geq 7 \quad \text{and} \quad 6x + 2 < 32$$

List the possible values of  $x$ .

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Answer ..... (3 marks)

**11** Solve  $\frac{1}{2}(3x - 1) < \frac{3}{8}(x + 1)$

**[3 marks]**

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Answer \_\_\_\_\_

12 (a) Solve  $-17 \leq 4x + 3 < 11$

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Answer ..... (2 marks)

12 (b) Work out the product of all the **integer** solutions to  $-17 \leq 4x + 3 < 11$   
You **must** show your working.

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Answer ..... (2 marks)

13  $x$  and  $y$  are integers such that

$$-5 < x \leq 3 \quad \text{and} \quad 2 \leq y \leq 7$$

Work out the **largest** possible value of  $x^2 + y^2$

[2 marks]

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Answer .....



**\*14 (a)** Sita is 158 cm tall.  
Teri is 164 cm tall.  
Helen is  $h$  cm tall.

Helen is taller than Sita but **not** taller than Teri.

Use **all** the information above to write down an inequality in  $h$  about Helen's height.

**[2 marks]**

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Answer \_\_\_\_\_

**\*14 (b)** Sita is  $x$  years old.  
Teri is 3 years older than Sita.  
Helen is 2 years younger than Sita.  
The total of their ages is 43 years.

Set up and solve an equation to work out their ages.

**[5 marks]**

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Sita \_\_\_\_\_ years old

Teri \_\_\_\_\_ years old

Helen \_\_\_\_\_ years old

15 Solve  $2(7x + 3) < 4x - 1$

[3 marks]

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Answer .....

16 Work out the smallest integer value that satisfies the inequality

$$5x + 2 > 3x + 7$$

[3 marks]

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Answer .....

17 List the **integer** values of  $x$  that satisfy the inequality  $-1 < 2x - 1 \leq 8$

[3 marks]

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Answer \_\_\_\_\_

5 (a)  $x = 4$  satisfies the inequality  $x < n$

What is the smallest possible **integer** value of  $n$ ?

[1 mark]

Answer .....

5 (b) Four integer values of  $y$  satisfy the inequality  $m \leq y \leq 1$

$m$  is an integer.

What is the value of  $m$ ?

[1 mark]

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Answer .....

5 (c)  $-r \leq w \leq r$  where  $r$  is a positive integer.

Write an expression in  $r$  for the number of integer values of  $w$  that satisfy this inequality.

[1 mark]

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Answer .....

**\*19** Dave and Helen attend the same school.

Dave lives 5 km from the school.

Helen lives 3 km from the school.

The distance between Dave's house and Helen's house is  $x$  km

Write, as an inequality, the minimum and maximum distance that  $x$  could be.

**[3 marks]**

.....  $\leq x \leq$  .....

Justify your answer in the space below.  
You may use a diagram if you wish.



School