

Inequalities

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 70 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 12): you must not use a calculator.
- **Section B** (questions 13 to 21): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 63.

Advice

- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

Q	Mark	Q	Mark
1		12	
2		13	
3		14	
4		15	
5		16	
6		17	
7		18	
8		19	
9		20	
10		21	
11			
TOTAL			

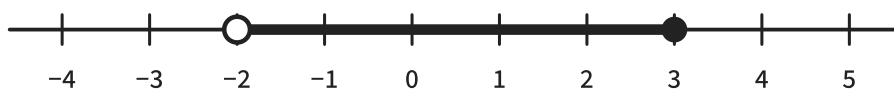
Section A



You must not use a calculator

Do not
write
outside
the box

- 1 Write down the inequality shown on the number line.



Answer _____

[2 marks]

- 2 n is an integer.

$$5 < 2n \leq 14$$

Write down all the possible values of n .

Answer _____

[2 marks]

- 3 Solve $6x - 5 > 2x + 9$

Answer _____

[2 marks]

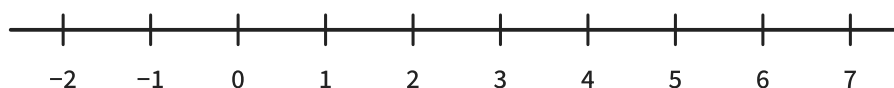
- 4 (a) Solve $3(x - 2) \leq 9$

Do not
write
outside
the box

Answer _____

[2 marks]

- (b) Show your answer to part (a) on the number line.



[1 mark]

- 5 Jess solves the inequality $7 - 3x < 19$
Here is her working.

$$7 - 3x < 19$$

$$-3x < 12$$

$$x < -4$$

Is Jess correct?

Give a reason for your answer.

[2 marks]

- 6 (a) Solve $-7 < 3x - 1 \leq 14$

Do not
write
outside
the box

Answer _____

[2 marks]

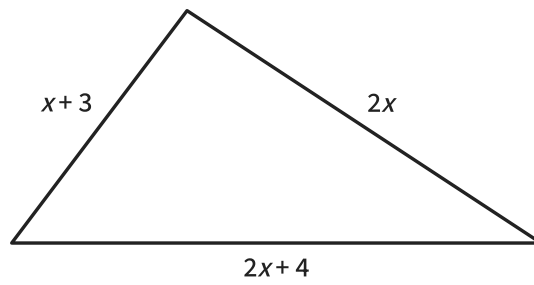
- (b) How many integers satisfy the inequality?

Answer _____

[1 mark]

7

The perimeter of this triangle is more than 40 cm and less than 52 cm.
All lengths are in centimetres.



Not drawn accurately

x is an integer.

Work out all the possible values of x .

Answer _____

[4 marks]

8

Solve $x^2 - 2x - 15 > 0$

Answer _____

[3 marks]

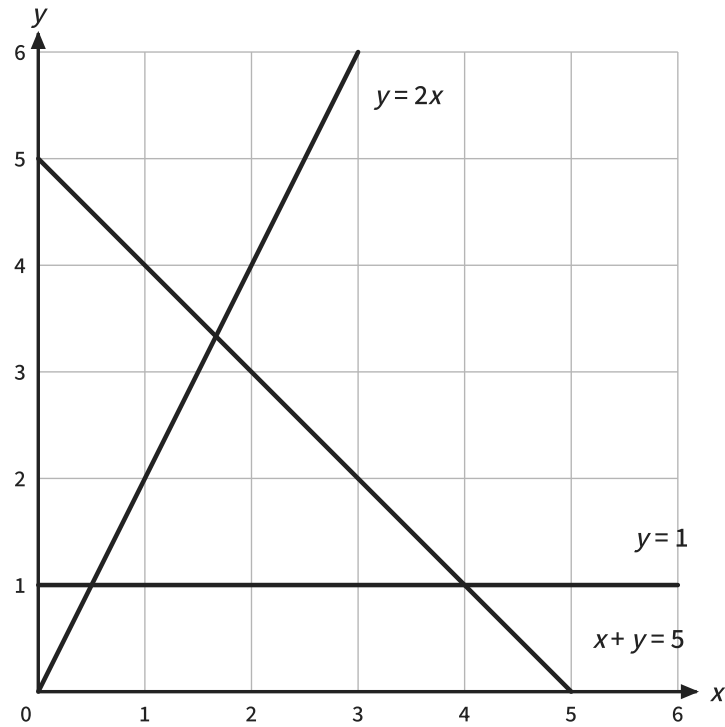
Do not
write
outside
the box

- 9 The lines $y = 1$, $x + y = 5$ and $y = 2x$ are drawn on the grid.

On the grid, shade the region that satisfies all three inequalities.

$$y \geq 1 \quad x + y \leq 5 \quad y \leq 2x$$

Label the region **R**.

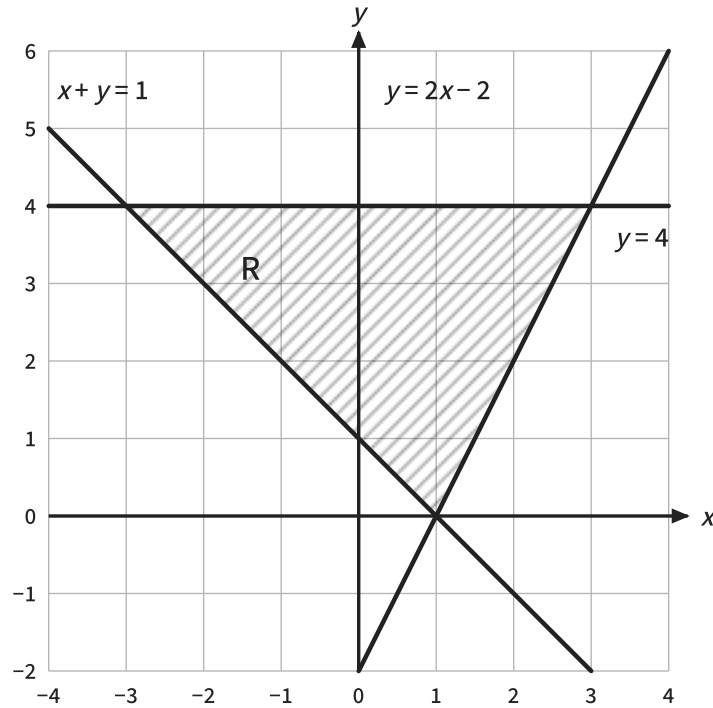


[3 marks]

Do not
write
outside
the box

- 10** The region **R** is shaded on the grid.

Do not
write
outside
the box



Write down the three inequalities that define the region **R**.

[3 marks]

- 11** Solve $2x^2 + 5x - 12 \leq 0$
Give your answer in set notation.

Answer _____

[3 marks]

12 n is an integer.

$$n^2 < 3n + 10 \text{ and } 4n - 3 > 1$$

Work out all the possible values of n .

Do not
write
outside
the box

Answer _____

[4 marks]

Section B



You may use a calculator

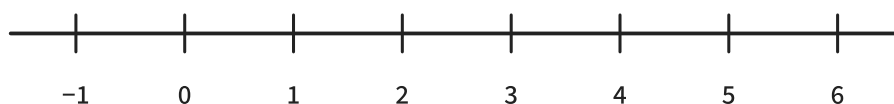
Do not
write
outside
the box

- 13** (a) Solve $2.6x + 4.15 \geq 10.65$

Answer _____

[2 marks]

- (b) Show your answer to part (a) on the number line.



[1 mark]

- 14** A youth club needs to raise at least £500 for a trip.
It has already raised £137.60
It sells cakes for £1.85 each to raise the rest.

Form and solve an inequality to work out the smallest number of cakes the club must sell.

Answer _____

[3 marks]

- 15** Work out the largest integer that satisfies $3.5x - 2.7 < 1.3x + 6.4$

Answer _____

[3 marks]

- 16** A lift can carry a total mass of no more than 630 kg.
A worker of mass 85 kg uses the lift to move boxes.
Each box has a mass of 24 kg.

Form and solve an inequality to work out the greatest number of boxes the worker can take in the lift at one time.

Answer _____

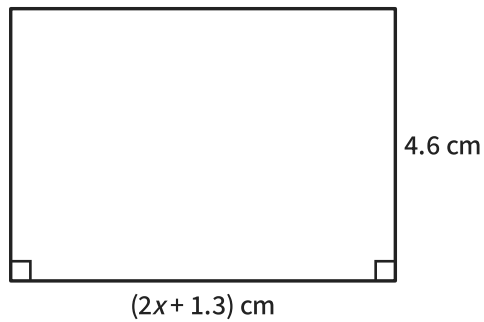
[3 marks]

17

The diagram shows a rectangle.

The area of the rectangle is less than 38.64 cm^2 .

The side of length $(2x + 1.3) \text{ cm}$ is longer than the side of length 4.6 cm .



Not drawn accurately

Work out the range of possible values of x .

Give your answer as an inequality.

Answer _____

[4 marks]

Do not
write
outside
the box

- 18** Ayo is choosing between two gyms.

	Joining fee	Cost for each month
Gym A	£18.50	£24.75
Gym B	none	£27.10

Ayo will be a member for m whole months.

Form and solve an inequality to work out the values of m for which Gym B is cheaper.

Answer _____

[4 marks]

- 19** Zainab says,
“8 is the smallest whole number that satisfies $4.75 - 0.6x < -0.31$ ”

Is Zainab correct?

You must show your working.

[3 marks]

- 20** This formula changes a temperature of C degrees Celsius to F degrees Fahrenheit.

$$F = 1.8C + 32$$

A plant grows best when the temperature satisfies

$$61.7 \leq F \leq 78.8$$

Work out the range of temperatures in degrees Celsius at which the plant grows best.
Give your answer as an inequality in C .

Answer _____

[3 marks]

- 21** Solve $\frac{2x - 3.4}{5} \geq x - 2.99$

Answer _____

[3 marks]

END OF QUESTIONS