

# OCR Paper 6H Practice Booklet

22 practice questions based on the advance information

Copies of this booklet, as well as hints & solutions, are available at [bossmaths.com/advanceinfo](https://bossmaths.com/advanceinfo)

---

## Question 1

Given that  $\frac{(x-3)^5}{x^{-7}} \times \frac{x^{-\frac{1}{2}}}{x} \equiv x^m$ , find the value of  $m$ .

---

## Question 2

(a) Circle the cube number:

9260

5832

4911

2748

(b) A pudding recipe for 4 people requires 120 grams of butter.

Calculate the amount of butter needed to make the pudding for 12 people.

---

### Question 3

The value of some machinery decreases by a fixed 4.5% every year.  
Ten years after its construction, the machinery had a value of £820.31.

What was the value of the machinery 7 years after its construction?

£.....

---

### Question 4

(a) Factorise  $16x^2 - 9$

(b) Expand and simplify  $t(7t - 4) - 5(7t - 4) + t(4 - 7t) + 3(7t - 4)$

---

### Question 5

Roberto is  $x$  years old.

Diogo is 5 years younger than Roberto.

Mohamed is 4 years older than Diogo.

- (a) Write an expression, in terms of  $x$ , for the sum of the ages, in years, of Roberto, Diogo, and Mohamed.

Moacir is 54 years older than Roberto.

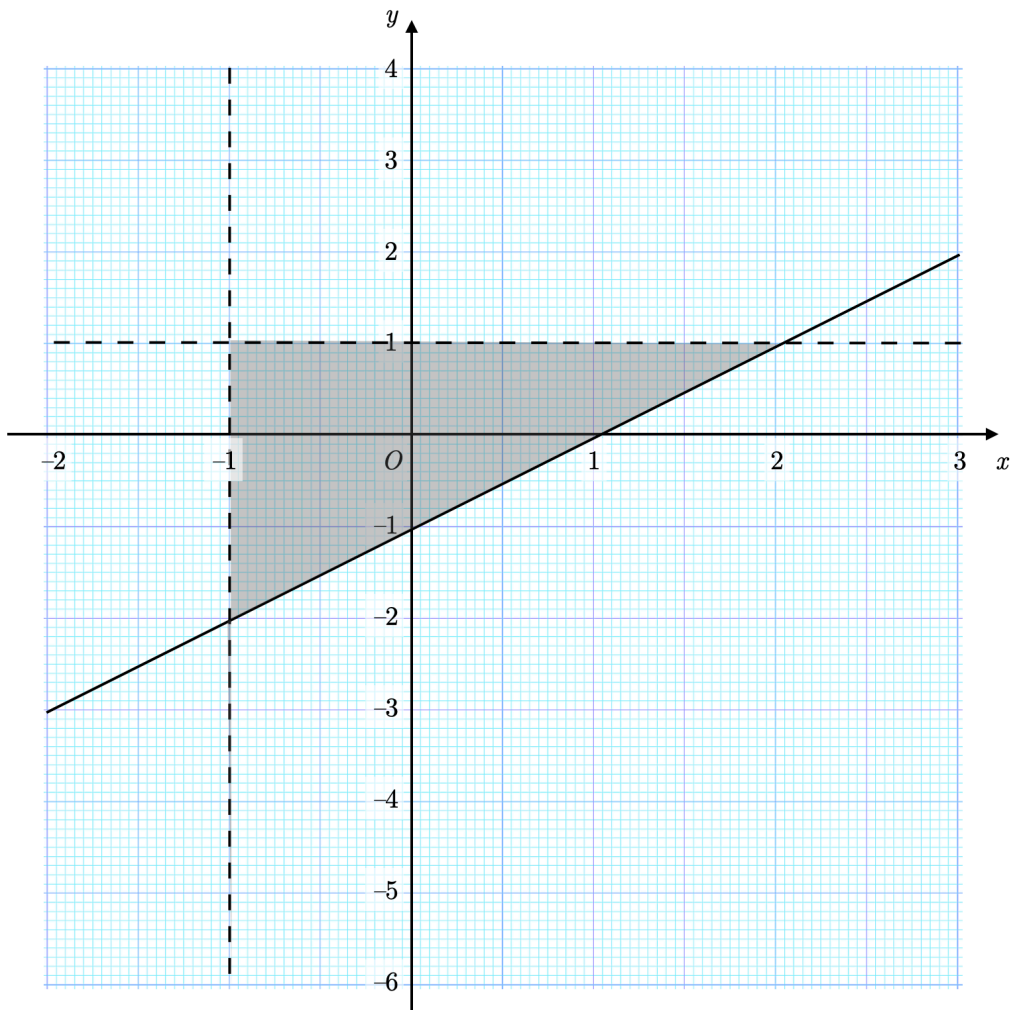
Moacir's age is equal to the sum of the ages of Roberto, Diogo, and Mohamed.

- (b) Find Diogo's age.

---

### Question 6

(a) Write down the three inequalities that define the shaded region.



(b)  $x$  and  $y$  are integers. On the diagram, mark with a cross each of the three points that satisfy the three inequalities you wrote down in part (a).

---

### Question 7

The highest common factor of  $m$  and  $n$  is 21.

The lowest common multiple of  $m$  and  $n$  is 126.

$m$  is an even number less than 50.

Find the values of  $m$  and  $n$ .

---

### Question 8

The circumference of a circle is 80 cm.

Calculate the area of the circle, correct to 3 significant figures.

---

Question 9

The diagram shows a trapezium  $ABCD$  and one of its diagonals,  $BD$ .

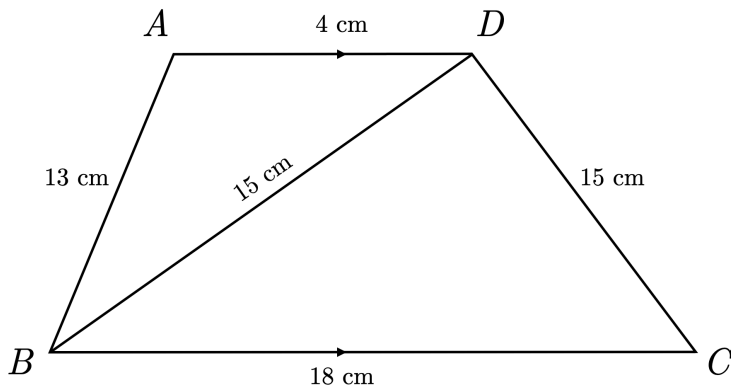
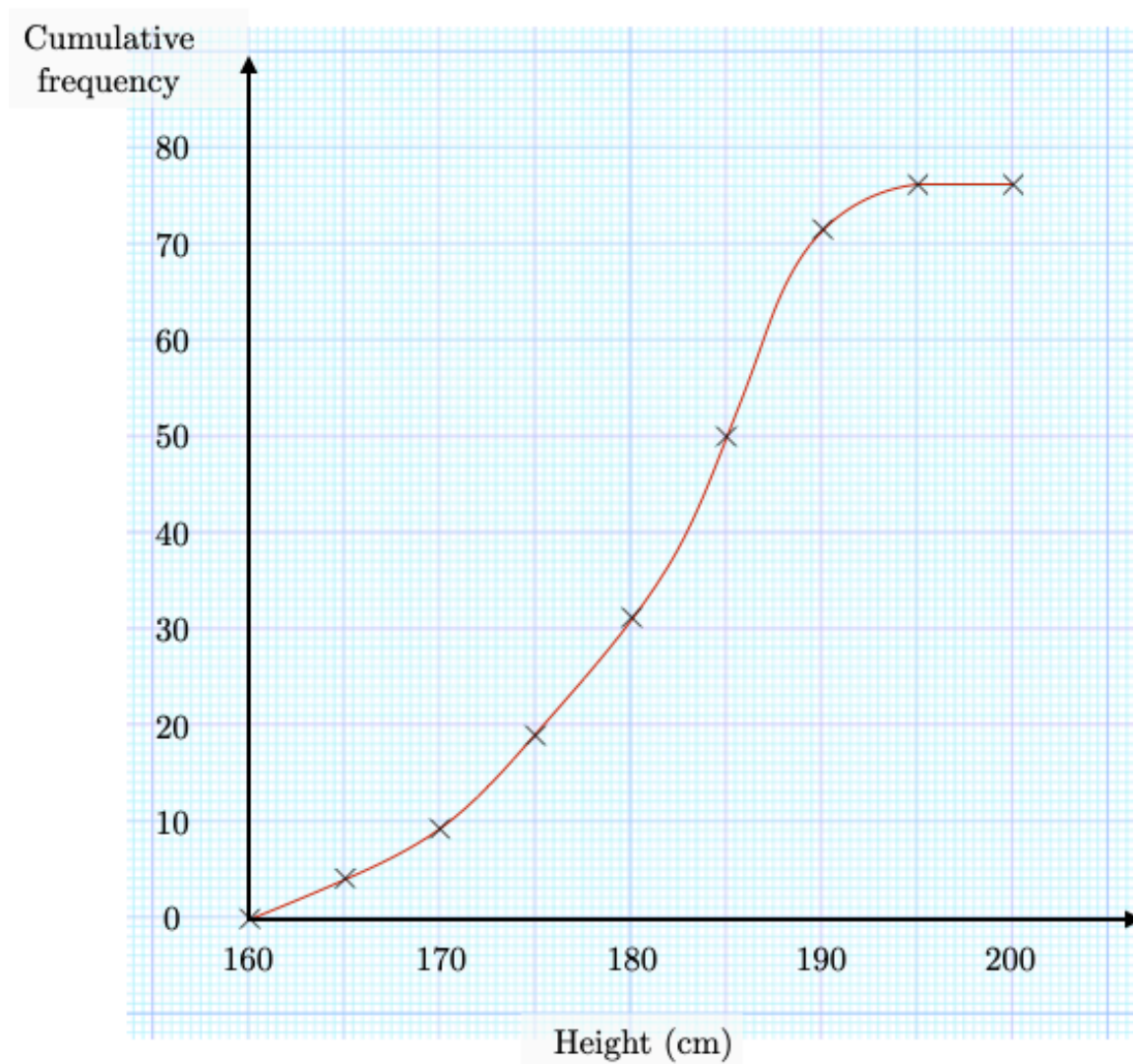


DIAGRAM NOT DRAWN ACCURATELY

Find the area of this trapezium.

### Question 10

This cumulative frequency graph shows information about the heights, in cm, of rowers at a rowing club.



A rower is selected at random from the club. Estimate the probability that this rower is more than 186 cm tall.

---

### Question 11

$y$  is directly proportional to  $\sqrt{x}$ .

When  $x = 4 \times 10^{40}$ ,  $y = 15$ .

Find the value of  $y$  when  $x = 9 \times 10^{26}$ . Write your answer in standard form.



---

### Question 12

At the start of an experiment, the mass of the bacteria in a petri dish is 1.35 g.

The mass of the bacteria increases by 5.8% every hour.

A scientist notes the mass of the bacteria every hour.

After  $n$  hours, the scientist recorded a mass of 2.00 grams.

Find the value of  $n$ .

---

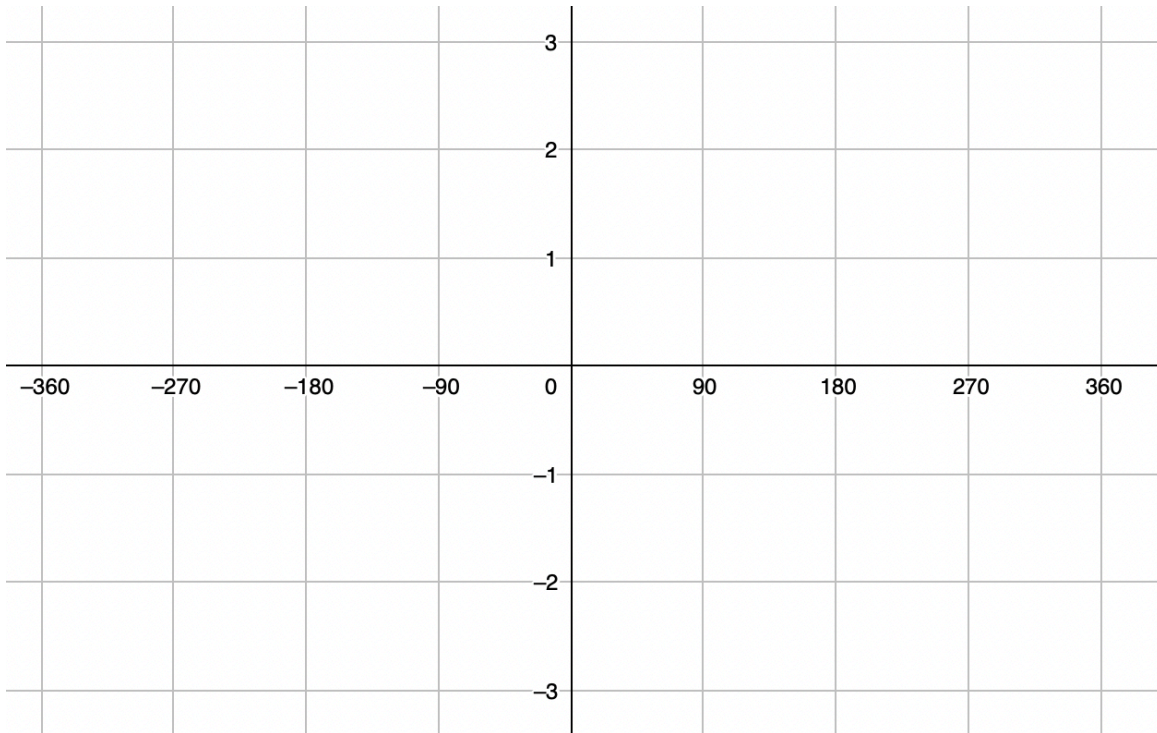
### Question 13

Write  $x^2 + 10x - 19$  in the form  $(x + a)^2 + b$

---

### Question 14

On the grid, sketch the graph of  $y = \cos x^\circ + 1$  for  $-360^\circ \leq x \leq 360^\circ$



---

### Question 15

The chemical element gallium has a density of  $5.91 \text{ g/cm}^3$ .

Convert this density into  $\text{kg/m}^3$ .

---

### Question 16

The diagram shows a triangular prism.

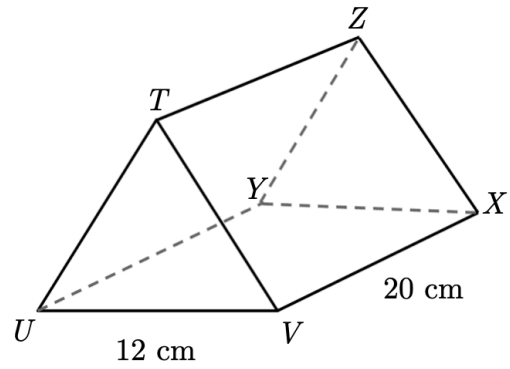
The triangular faces of this prism are equilateral triangles.

A rectangular face of the triangular prism is then glued to a congruent face of a cuboid measuring  $12\text{ cm} \times 12\text{ cm} \times 20\text{ cm}$ .

Once glued, the resulting solid is a pentagonal prism.

Work out the surface area of this pentagonal prism.

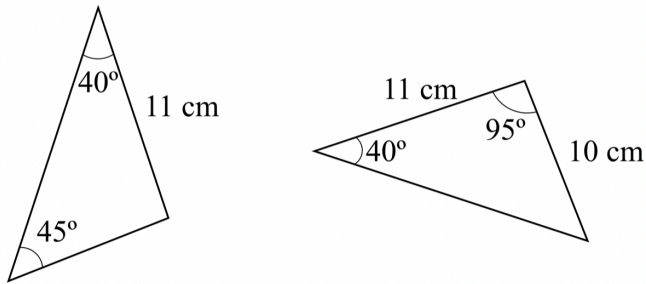
Round your answer to 3 significant figures.



---

### Question 17

Show that these triangles are congruent.



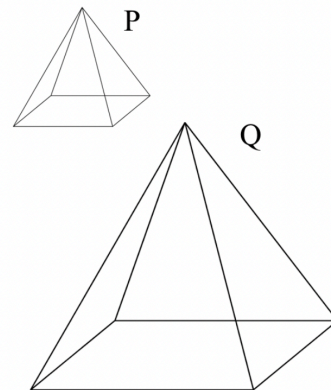
---

### Question 18

P and Q are two mathematically similar pyramids.

Q has a surface area of  $90\text{ cm}^2$  and a volume of  $54\text{ cm}^3$ .

P has a surface area of  $40\text{ cm}^2$ . Find the volume of P.



---

### Question 19

Solve  $x + 4 = \frac{10}{x}$

Round your solutions to 3 decimal places.

---

Question 20

(a) Make  $p$  the subject of the formula  $m = \frac{8(q + 3p)}{p}$

(b) Work out the value of  $p$  when  $q = 0.34$  and  $m = 0.7$

---

## Question 21

Jonny plays a game which involves picking numbered cards.

The first bag contains four cards, numbered from 1 to 3.

The second bag contains six cards, numbered from 1 to 5.

Jonny picks one card at random from each bag and multiplies the numbers on his two cards.

(a) Draw a sample space to show all the possible outcomes.

Players win a prize if the product of the numbers on their cards is even.

(b) Given that Jonny wins a prize, find the probability that the product of his two numbers is greater than 9.

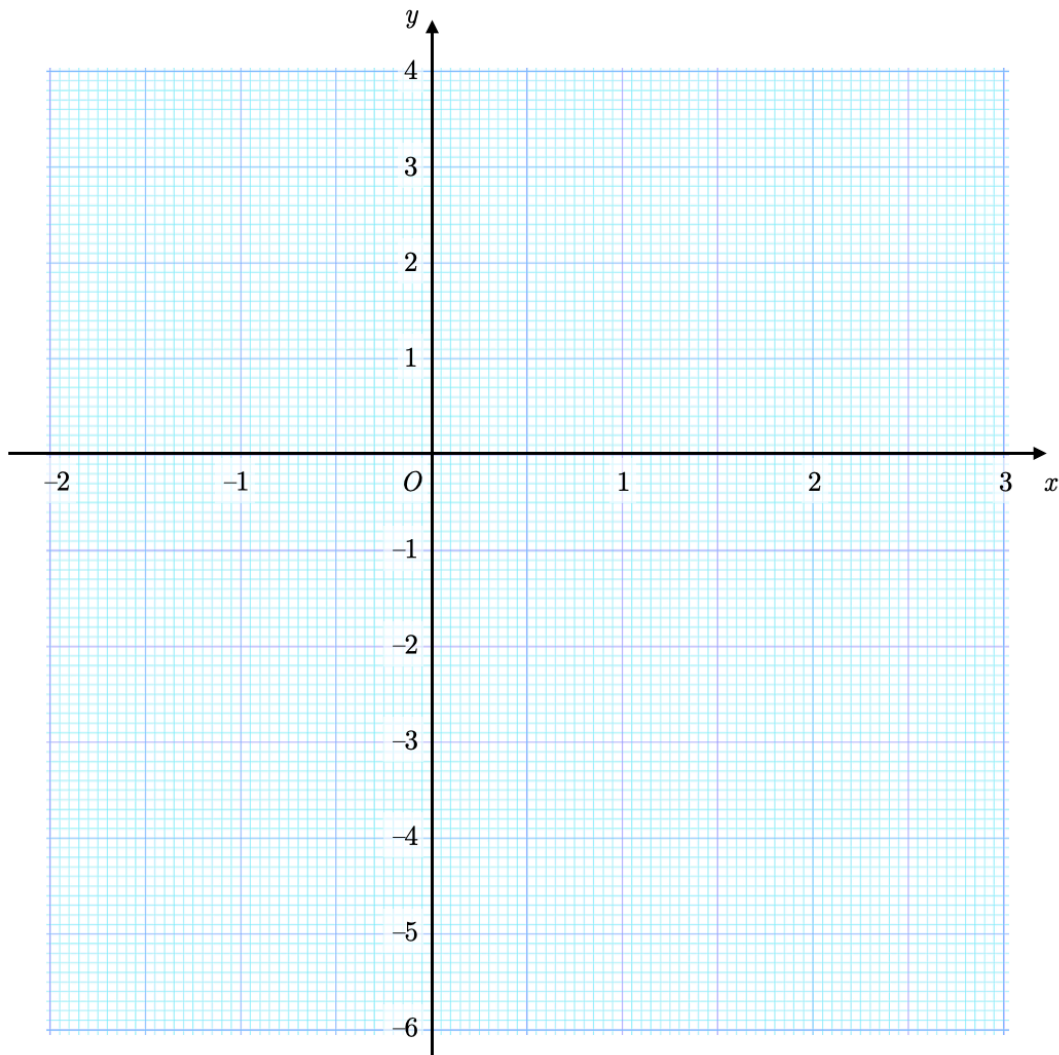
---

### Question 22

(a) Complete the table of values for  $y = x^2 - 5$

$x$	-2	-1	0	1	2	3
$y$						

(b) On the grid, draw the graph of  $y = x^2 - 5$  for values of  $x$  from -2 to 3.



(c) Write down the coordinates of the turning point of the graph.