

First name	
Last name	
School	

CE AT 13+

# MATHEMATICS



Core Calculator Paper

Specimen Paper

Date

Time allowed: 60 minutes

## Instructions

Answer as many questions as you can.

Clear working to long-answer questions should be written in the grey boxes, along with any final results, which should be double underlined.

**For long-answer questions, marks will be awarded for working.**

**Answers should include correct units, where necessary.**

Answers given as fractions should be reduced to lowest terms and written as mixed numbers, where appropriate.

Diagrams are not drawn accurately unless otherwise specified.

You are encouraged to cross out mistakes neatly, not erase them.

Write no more than 6 digits from your calculator as an answer.

## Information

You may use a simple scientific calculator with algebraic logic,  $\pi$  and square root buttons.

Calculators with more advanced functions are not permitted.

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1. (a) Use your calculator to work out the value of

(i)  $1.8 + 4.73^2$

(ii)  $\frac{\sqrt{170 - 1}}{7 + 1}$

Answer: ..... [2]

Answer: ..... [2]

- (b) Write your answers to part (a) correct to 2 decimal places.

Answer: ..... [1]

Answer: ..... [1]

2. (a) Write the ratio **24 : 18** in its simplest form.

Answer: ..... [2]

- (b) The ratio of boys to girls at a school is **7 : 3**

If there are 120 children altogether, how many girls are there?

[3]

3. Write the **next three** numbers in each sequence.

(i) **7** , **11** , **15** , **19** , ..... , ..... , ..... [2]

(ii) **16** , **8** , **4** , ..... , ..... , ..... [2]

4. Complete these

(i)  $365.7 + \dots = 893.2$  (ii)  $15.9 \times \dots = 116.07$

(iii)  $\dots \div 5.2 = 9$  (iv)  $24.68 - \dots = 80$

[4]

5. Write **true** or **false** under each expression below.

$$5 \times 3 = 15 + 2 = 17$$

.....

$$18 \times 4 = 9 \times 8$$

.....

$$5^2 = 5 \times 2$$

.....

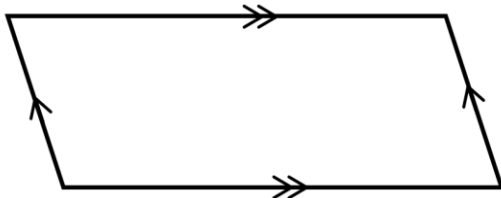
$$7 \div 28 = 28 \div 7$$

.....

[2]

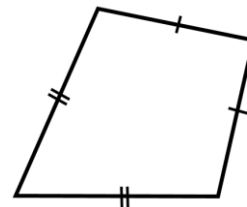
6. Write the name of each shape.

(i)



Answer: .....

(ii)



Answer: .....

[2]

7. (a) Jenson buys a car for **£127 500**  
He sells it to Lewis for 12% more.  
How much does Lewis pay?



[3]

- (b) In one year, Greta grows from **140 cm** to **161 cm**.  
Calculate her **percentage increase** in height.

[2]

8. (a) Simplify

(i)  $s + s$

$= \dots\dots\dots$

(ii)  $t \times t$

$= \dots\dots\dots$

[2]

(iii)  $8a + 3 - 2a + 5$

$= \dots\dots\dots$

(iv)  $7c^2 \times 3c$

$= \dots\dots\dots$

[4]

(b) Multiply out the brackets and simplify

(i)  $5e + 2(3e - 4)$

(ii)  $10 - 3(3z - 2)$

[4]

(c) Factorise fully

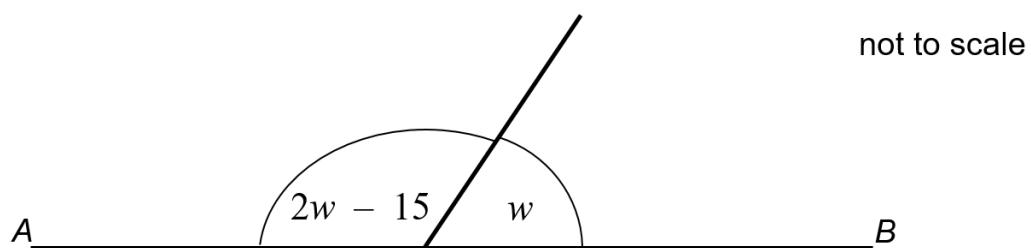
(i)  $18x - 12$

(ii)  $25y + 5$

[3]

9. In the diagram,  $AB$  is a straight line and the angles are marked in degrees.

Work out the size of angle  $w$



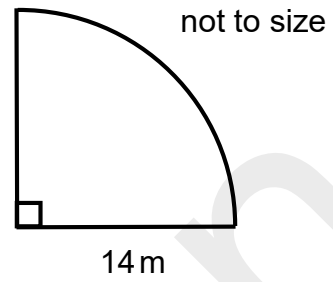
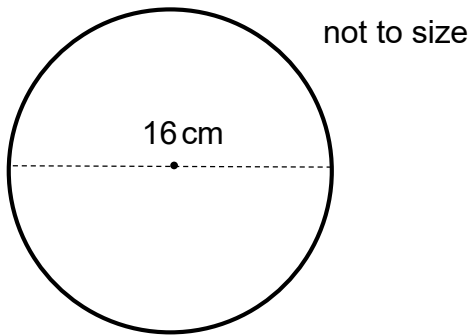
[3]

10. For this question, give answers correct to the nearest whole number.

Calculate

(i) the **circumference** of this circle.

(ii) the **area** of this quadrant.



A large empty rectangular box for writing the answer.

[6]

11. Here are Ted's scores in 12 mental tests.

8    4    7    4    6    7    8    7    9    10    4    4

(i) What was his **modal** score?

Answer: ..... [1]

(ii) Work out his **mean** score.

[3]

(iii) Work out his **median** score.

[3]

(iv) Circle the type of average you think, in this case, is **least** appropriate?

mode	mean	median
------	------	--------

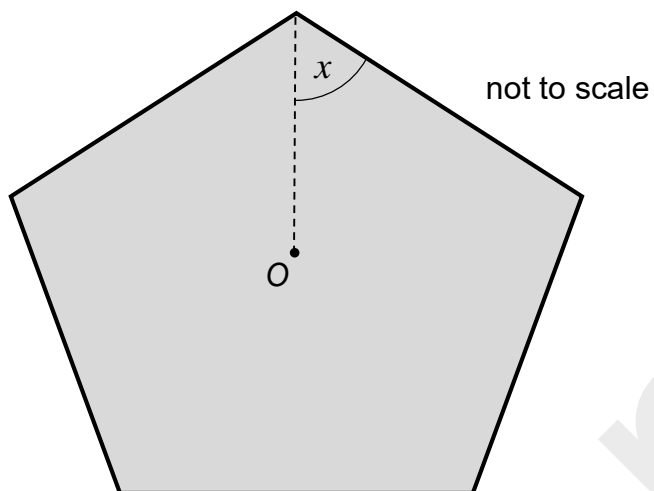
Explain: .....

.....

[2]



12. (a) Here is a regular pentagon with centre  $O$ .

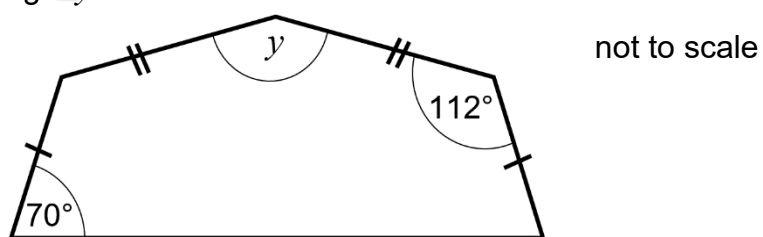


Calculate the size of angle  $x$

[5]

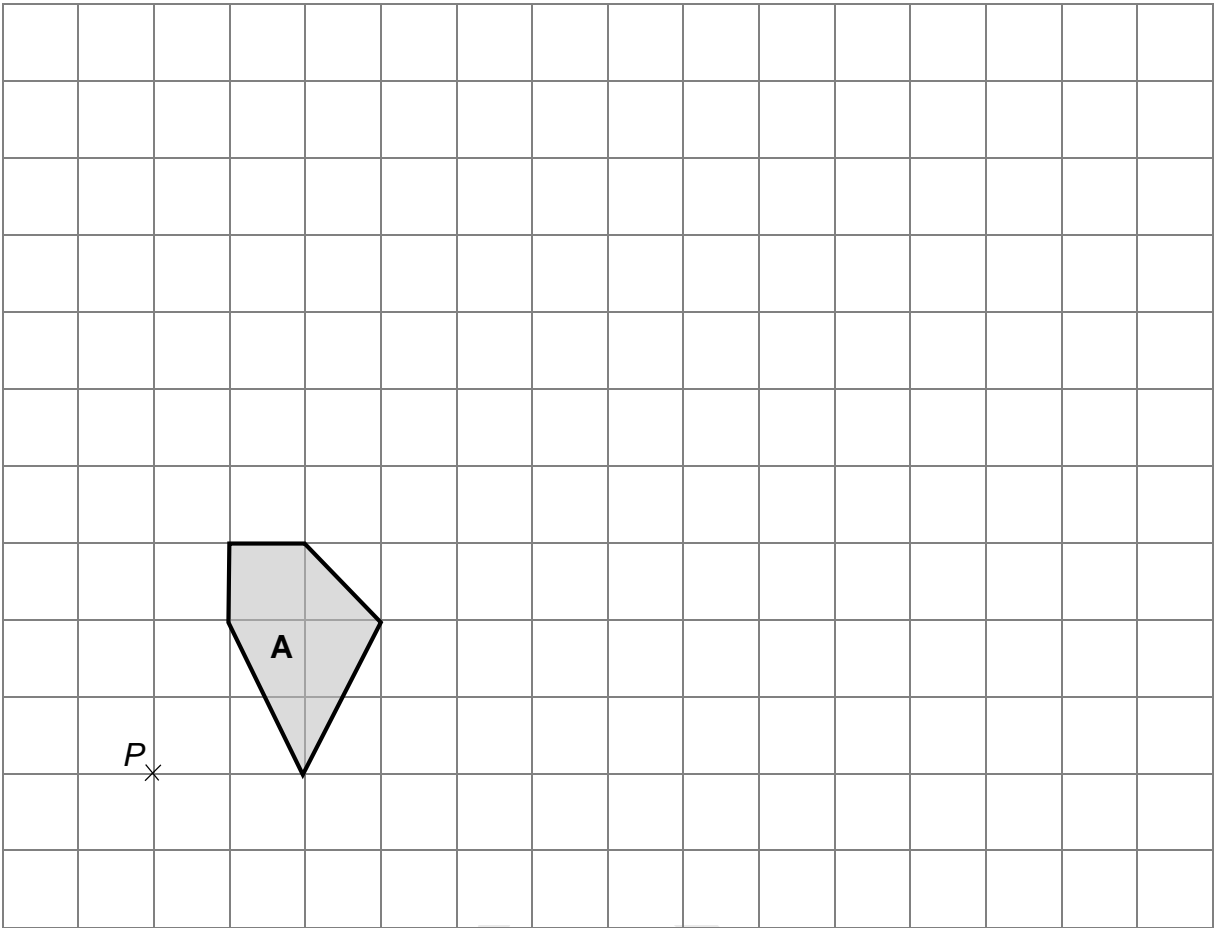
- (b) Here is another pentagon.

Calculate the size of angle  $y$



[3]

13. Shape **A** is drawn on the centimetre grid below.



- (a) Enlarge shape **A** scale factor 3 from the centre **P**.  
 Label the new shape **B**.

[3]

- (b) Shape **A** has an **area of 3.5cm<sup>2</sup>** and a **perimeter of 7.89 cm**.  
 (i) Calculate the **area** of shape **B**.      (ii) Calculate the **perimeter** of shape **B**.

[4]

14. (a) Paula cycles 455 kilometres in 14 hours.

Calculate her average **speed**.

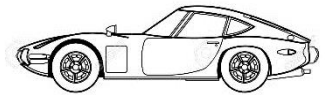


A large empty rectangular box for writing the answer to question 14(a).

[3]

- (b) Jess drives for 1 hour and 45 minutes at a speed of 28 kilometres per hour.

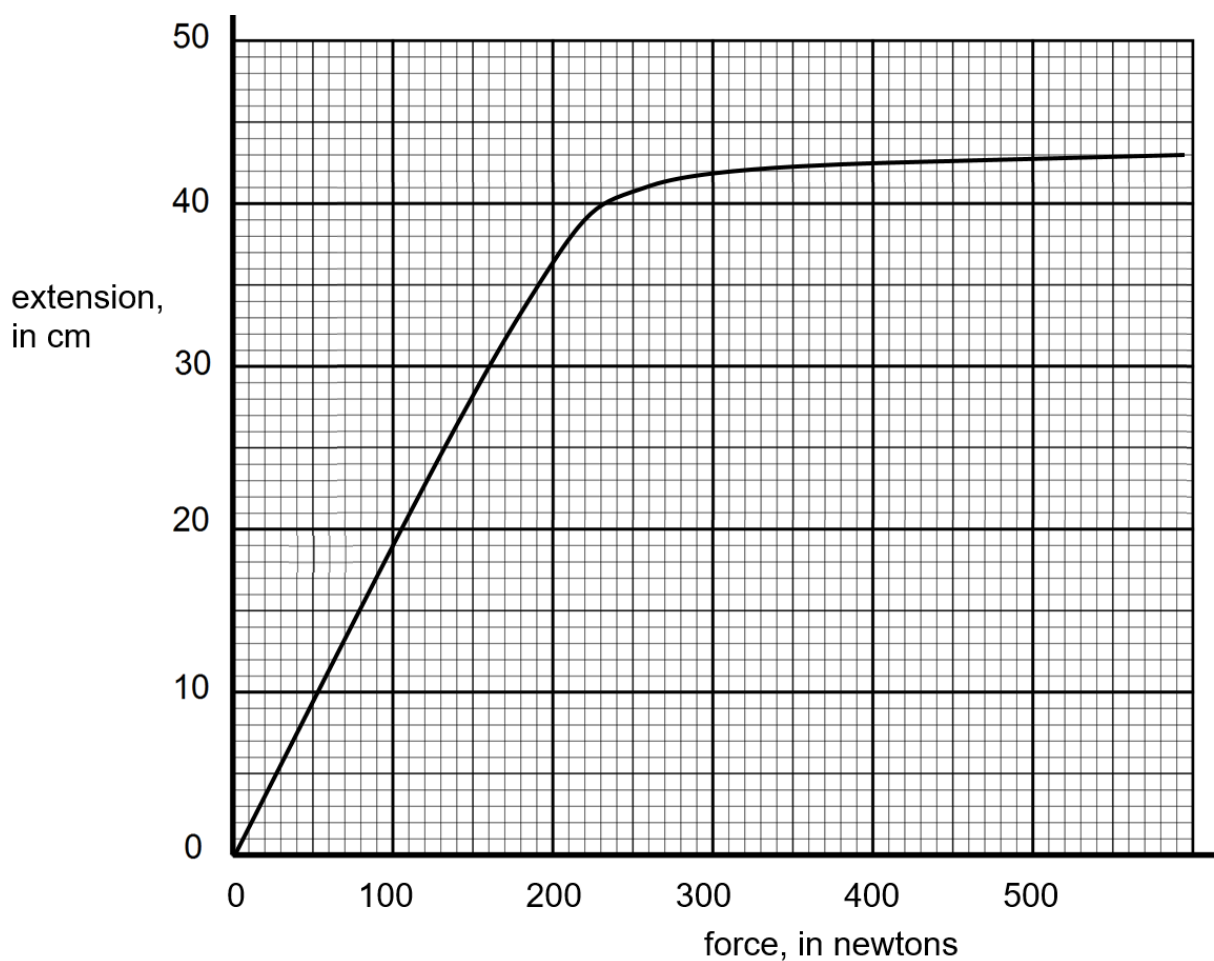
Calculate the **distance** she drives.



A large empty rectangular box for writing the answer to question 14(b).

[3]

15. This graph shows how much a rubber band stretches (extension) when a force is applied.



- (a) What is the maximum extension of the rubber band shown on the graph?

Answer: ..... [1]

- (b) **Showing clearly where you take your readings,**

- (i) find the force needed to stretch the rubber band by 21 cm

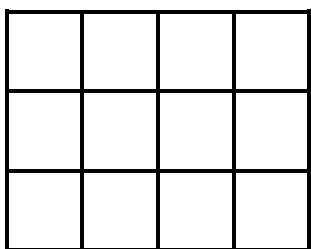
Answer: ..... [2]

- (ii) find how far the band stretched when a force of 200 newtons was applied.

Answer: ..... [2]

16. Here is a rectangle divided up into squares.

How many squares are here altogether?



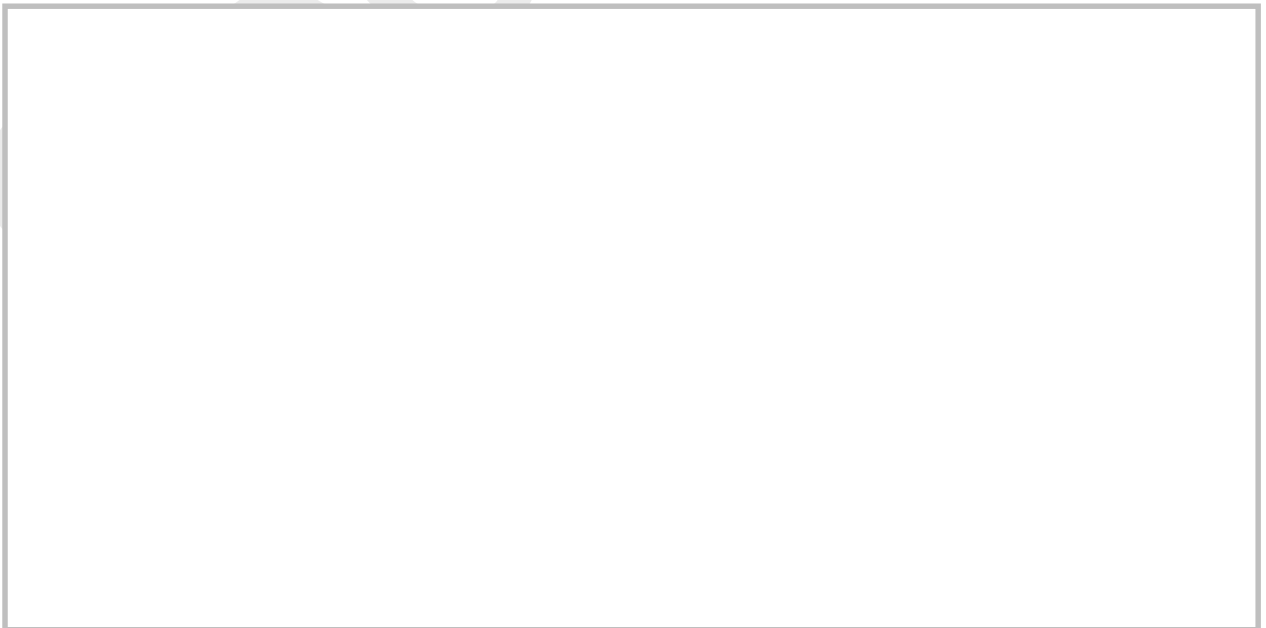
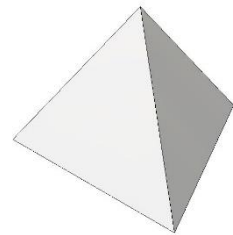
[4]

17. **Emily** has twice as many marbles as **James**.  
**Edward** has 3 more marbles than **James**.  
The three children have 23 marbles altogether.  
How many marbles does James have?



[3]

18. Here is a tetrahedron.  
It is a pyramid with equilateral triangular faces.  
Draw as many different **nets** of a tetrahedron as you can.



[4]

19. A 10p coin has a diameter of 24.5 mm.

One mile is equal to 1.6093 km.



For charity, a straight line of 10p coins, one touching the next, **one mile long**, is laid down.

What is the total value of all the coins in the line?

A large, empty rectangular box with a thin grey border, intended for the student to write their answer to the question.

[4]

(Total marks: 100)