Test 2 **Essential Maths Book 9H Units 3 and 4**

You need squared paper. Calculators may be used

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1. Look at the sequence $\frac{1}{3}, \frac{2}{4}, \frac{3}{5}, \frac{4}{6}, \ldots, \ldots$

Write down (a) the 10th term (1 mark)

(b) the *n*th term (2 marks)

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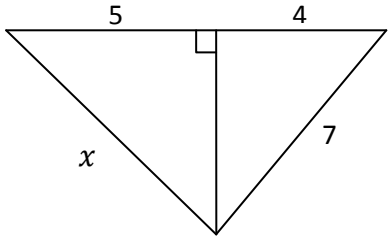
2. 

Find the length x in the diagram.

The lengths are in cm.

Give your answer correct to two decimal places.

(3 marks)

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3. The value of a new car is £15000.

The value of the car depreciates by 20% per year.

Work out the value of the car after 2 years. (2 marks)

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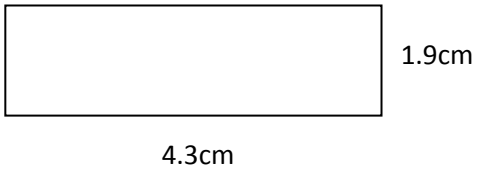
4. The dimensions of the rectangle are given correct to one decimal place.



(a) Write down the smallest possible length of the rectangle. (1 mark)

(b) Work out the upper limit for the perimeter of the rectangle. (2 marks)

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5. (a) Estimate the answer to 213 x 28.

Show how you made your estimate. (1 mark)

(b) Work out the exact answer to 213 x 28.

Show your working. (1 mark)

6. Helicopter A flies 200km on a bearing of 255°.

Helicopter B flies 100km on a bearing of 345°.

Draw a diagram to illustrate the above.

How far apart are the two helicopters? (3 marks)

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7. An empty paddling pool is in the shape of a cuboid.

It is 8.3m long and 4.7m wide.

$12m^3$ of water is poured into the pool.

How deep is the water? (3 marks)

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8. There are about 6000 MacGibson burger restaurants in America.

Each restaurant serves about 3000 people every day.

There are about 260 million Americans.

A newspaper report said**:**

"Every day 7% of Americans eat

at MacGibson restaurants."

Is the report fair ? Show your working. (3 marks)

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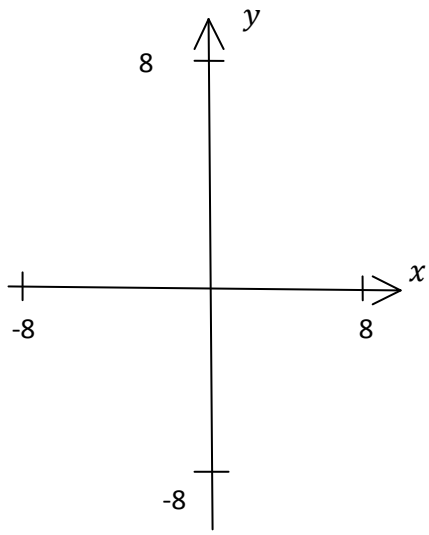
9. Draw a pair of axes for x and y from −8 to +8



Plot and label the following triangles:

Δ1: (4, −3) (7, −3) (7, −5).

Shade this triangle.

Δ2: (−4, 3) (5, 3) (5, −3)

Δ3: (4, 5) (7, 5) (7, 7)

Δ4: (−5, −3) (−2, −3) (−2, −5)

Describe fully the following transformations:

(a) Δ1 → Δ2 (b) Δ1 → Δ3 (c) Δ1 → Δ4 (4 marks)

10. Solve the simultaneous equations

$3x - y = 7$

$x + y = -3$ (3 marks)

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11. After an increase of 15%, the price of a golf bag is £74.75.

Find the price of the bag before the increase. (2 marks)

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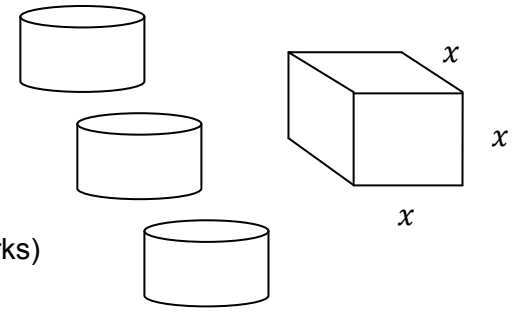
12. Three cylinders of radius 2cm and thickness 1.5cm are melted down to form a cube of side x cm.

Find x, correct to 2 decimal places. (4 marks)



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13. The numbers are written in a repeating pattern. The first base number is 1, the second base number is 6, the third base number is 11 and so on.

3	4		8	9		13	14		
2		5	7		10	12		15	
1			6			11			16

↑ 1st base number ↑ 2nd base number

(a) What is the 100th base number? (2 marks)

(b) What is the *n*th base number? (2 marks)

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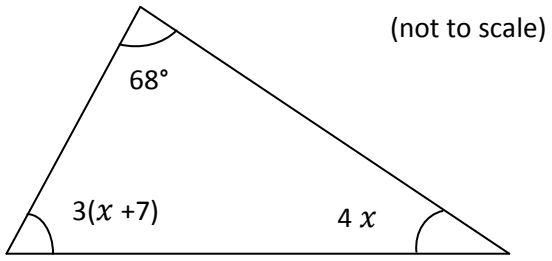
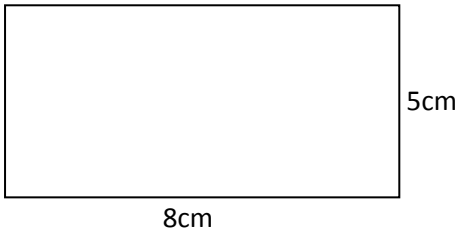
14. Find the largest angle in this triangle.
Show your working



(2 marks)

15. 

The dimensions of this rectangle have been measured correct to the nearest cm. Work out the least possible length of a diagonal of this rectangle.

(3 marks)

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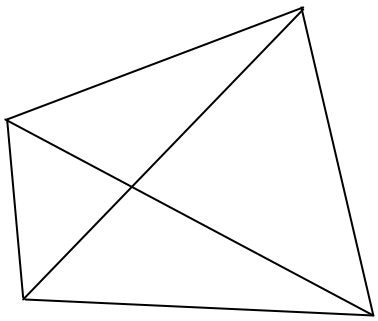
16. A tank in the form of a cylinder is filled to a depth of 30cm.

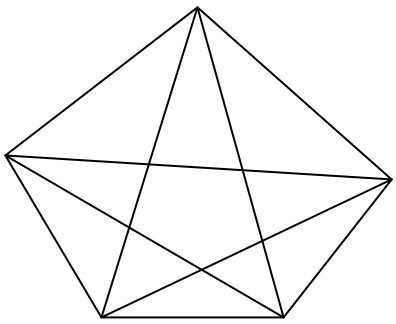
This takes 18 litres of water.

Find the diameter of the tank. (3 marks)

17.



A quadrilateral has 2 diagonals.



A pentagon has 5 diagonals.

(a) Draw a hexagon and a seven- sided polygon.

(b) Write down the number of diagonals for each of these polygons. (2 marks)

(c) Use your results to *predict* the number of diagonals you can draw in a polygon with 9 sides.

Show your method. (3 marks)

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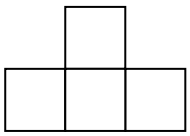
18. Here is a shape made from squares of side 1cm.

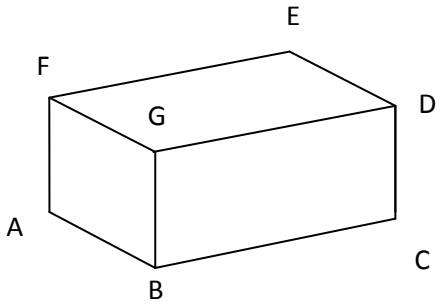


(not to scale)

(a) Write down the perimeter and the area of this shape. (1 mark)

(b) Design a shape, using the same size squares, which has a perimeter of 18cm and an area of 18cm². (2 marks)

19.



The diagram shows a cuboid in which AB = 6cm, BC= 8cm and CD = 3.5cm.

Calculate the length of the diagonal AD.

(3 marks)

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20. By drawing a suitable diagram on squared paper, reflect a shape **A** of your own choice in the x – axis and then reflect the image of shape **A** in the line $y = x$.

Describe the single transformation which is equivalent to these two successive reflections.

(3 marks)