

Write your name here

Surname

Other names

Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Higher Tier

Wednesday 13 November 2013 – Morning

Time: 1 hour 45 minutes

Paper Reference

5MM2H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks



Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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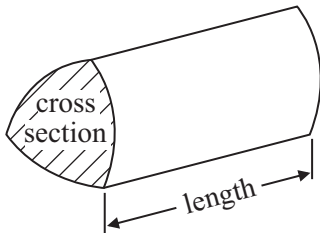
PEARSON

GCSE Mathematics 2MM01

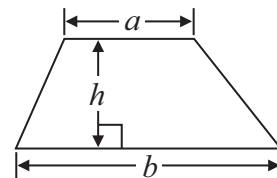
Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section \times length

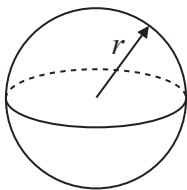


Area of trapezium = $\frac{1}{2} (a + b)h$



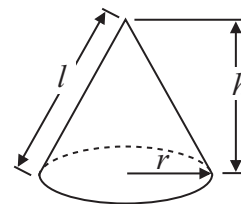
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$

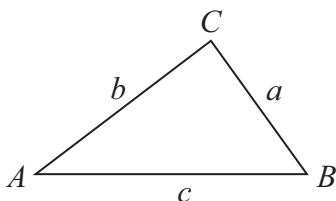


Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$



In any triangle ABC



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Use your calculator to work out $\frac{4.3 \times 2.6}{23.4 - 6.06}$

.....
(Total for Question 1 is 2 marks)

2 (a) Increase £180 by 20%

£.....
(3)

(b) Work out 26 as a percentage of 40

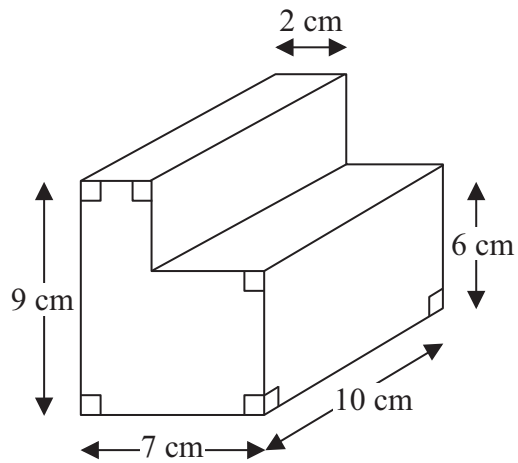
.....%
(2)

(Total for Question 2 is 5 marks)



3 The diagram shows a solid L-shaped prism.

Diagram **NOT** accurately drawn



Calculate the volume of this prism.

..... cm³

(Total for Question 3 is 3 marks)



4 Some counters are red or green or blue.

$\frac{3}{10}$ of the counters are red.

$\frac{1}{10}$ of the counters are green.

The rest of the counters are blue.

There are 60 blue counters.

How many red counters are there?

.....
(Total for Question 4 is 4 marks)



5 $w = 5x + y$
 $x = 9$
 $y = -7$

(a) Work out the value of w .

.....
(2)

A 10-sided polygon has 3 angles of size c degrees and 7 angles of size d degrees.

(b) Write down an expression, in terms of c and d , for the total, in degrees, of all 10 angles.

.....
(2)

(Total for Question 5 is 4 marks)



6 This shape is a quarter of a circle of radius 5 cm.

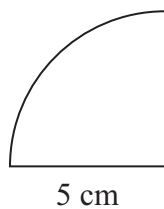


Diagram **NOT**
accurately drawn

(a) Find the area of the shape.

..... cm²
(2)

(b) Find the perimeter of the shape.

..... cm
(3)

(Total for Question 6 is 5 marks)

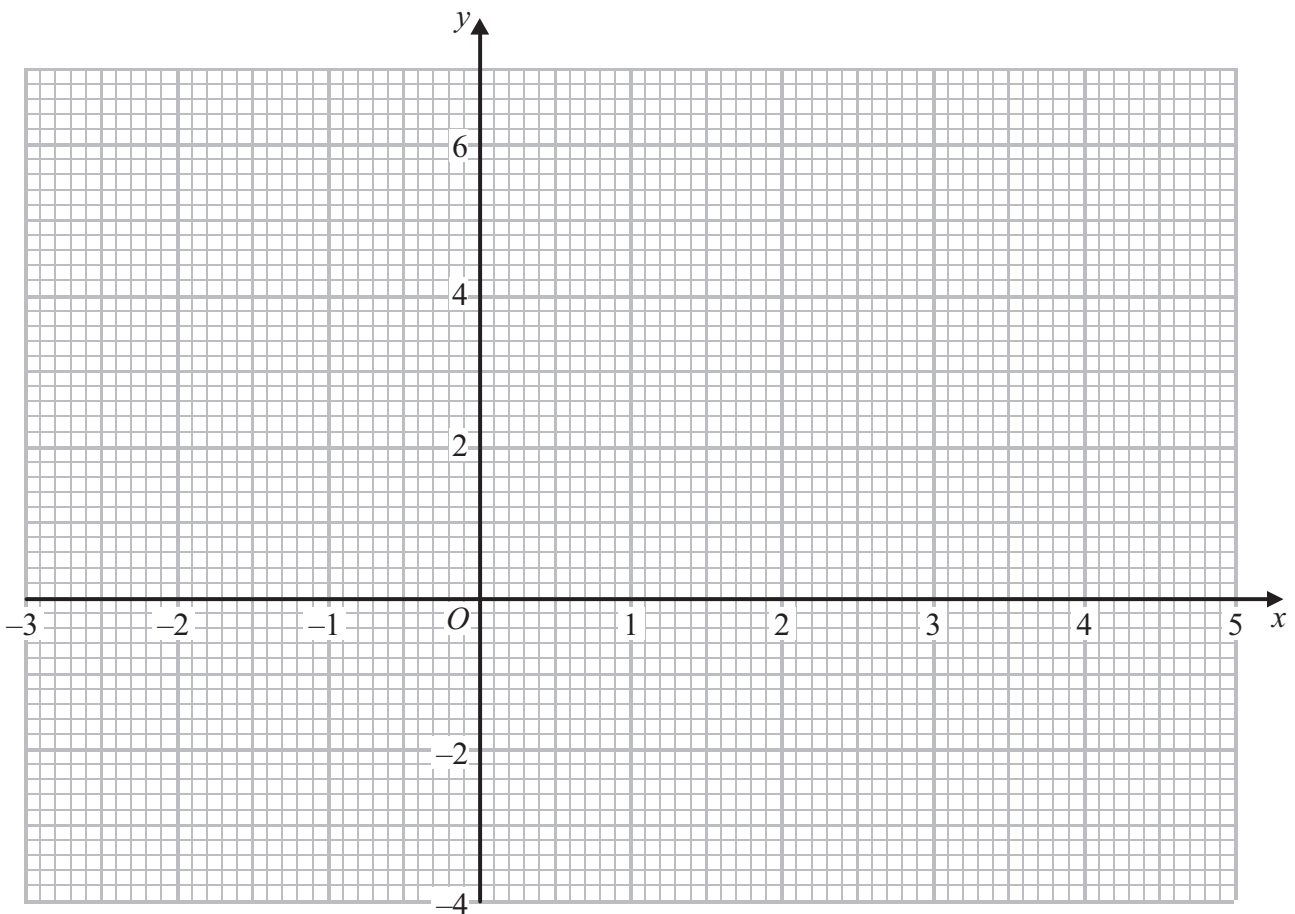


7 (a) Complete the table of values for $y = x^2 - 2x - 2$

x	-2	-1	0	1	2	3	4
y	6						6

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x - 2$ for values of x from -2 to 4



(2)

(c) Use your graph to find estimates for the solutions of the equation $x^2 - 2x - 2 = -1$

.....
(2)

(Total for Question 7 is 6 marks)



8 $-2 < n \leq 3$
 n is an integer.

(a) Write down all the possible values of n .

.....
(2)

(b) Solve $2x + 3 < 8$

.....
(2)

(Total for Question 8 is 4 marks)

9 The diagram shows 3 sides of a regular polygon.

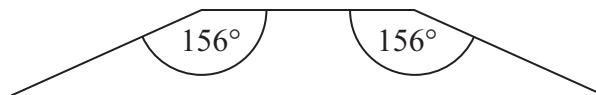


Diagram **NOT**
accurately drawn

Each interior angle of the regular polygon is 156°

Work out the number of sides the regular polygon has.

.....
(Total for Question 9 is 3 marks)



10 The diagram shows two diagonals in a rectangle.

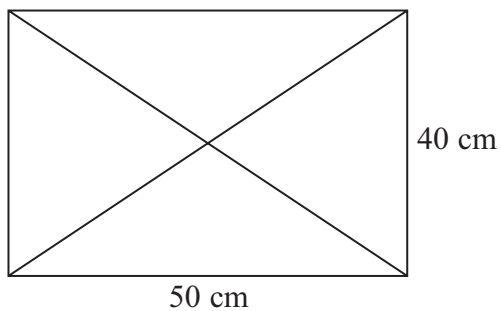


Diagram **NOT** accurately drawn

Work out the total length of the four sides of the rectangle and the two diagonals.

..... cm

(Total for Question 10 is 5 marks)

11 Work out $(7.8 \times 10^8) \div (6.5 \times 10^3)$
Give your answer in standard form.

.....

(Total for Question 11 is 2 marks)



12 There are only red beads and green beads in a bag.

The ratio of the number of red beads to the number of green beads is 5 : 9

(a) What fraction of the beads are red?

.....
(1)

There is a total of 84 beads in the bag.

(b) How many of the beads are green?

.....
(3)

Susie is going to put some more beads in the bag.

There will still be only red beads and green beads in the bag.

Susie wants to have twice as many green beads as red beads in the bag.

*(c) What beads should she put in the bag?
You must explain your answer.

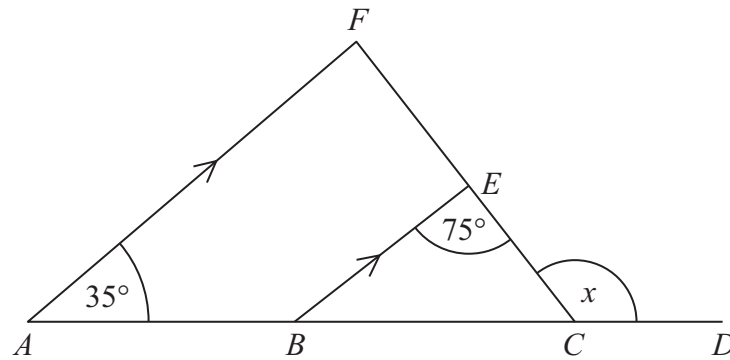
(3)

(Total for Question 12 is 7 marks)



*13

Diagram **NOT**
accurately drawn



$ABCD$ is a straight line.

AF is parallel to BE .

Angle $FAB = 35^\circ$

Angle $CEB = 75^\circ$

Work out the size of the angle marked x .

Give reasons for your answer.

(Total for Question 13 is 4 marks)



- 14 A number is decreased by 15%
The result is 204
Work out the number.

(Total for Question 14 is 3 marks)

15

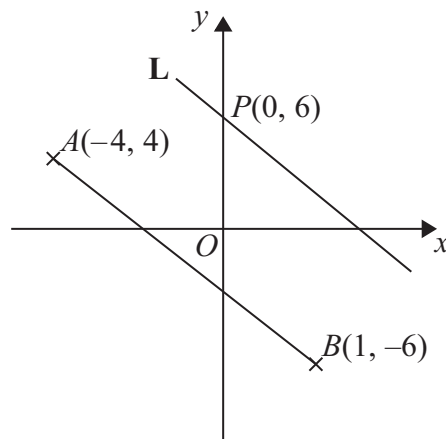


Diagram **NOT**
accurately drawn

The diagram shows the line AB .
The line L is parallel to AB and passes through the point $P(0, 6)$.
Find an equation of the line L .

(Total for Question 15 is 4 marks)



16 Make w the subject of the formula $3(w + x) = 4x + 7$

$w =$

(Total for Question 16 is 3 marks)

17

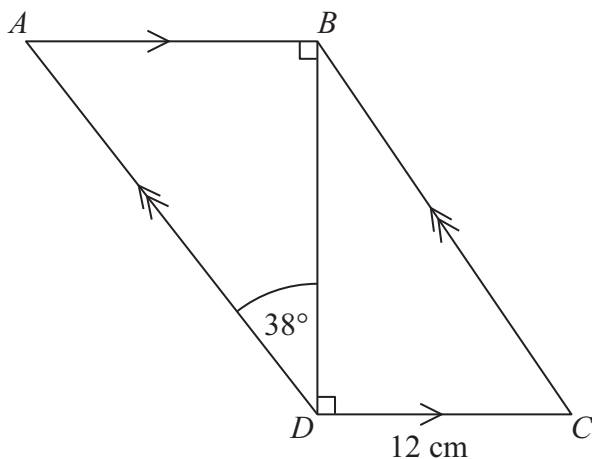


Diagram **NOT** accurately drawn

$ABCD$ is a parallelogram.

$DC = 12$ cm

Angle $ADB = 38^\circ$

Calculate the length of AD .

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 17 is 4 marks)



18 x and y are integers such that

$$\begin{aligned} & -2 \leq x < 3 \\ \text{and} & -1 < y \leq 4 \end{aligned}$$

Find the values of x and y when $x = y$.

.....
(Total for Question 18 is 2 marks)

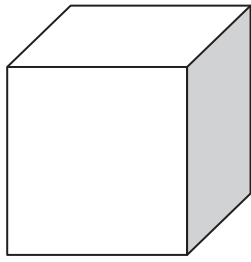
19 Solve $x^2 - 9x - 2 = 0$

Give your solutions correct to 2 decimal places.

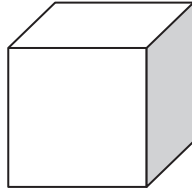
.....
(Total for Question 19 is 3 marks)



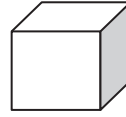
***20** Here are three cubes.



A



B



C

Diagram **NOT**
accurately drawn

The volume of cube **B** is 20% less than the volume of cube **A**.
The volume of cube **C** is 20% less than the volume of cube **B**.
Cube **A** has a volume of 8000 cm^3 .

What is the volume of cube **C** as a percentage of the volume of cube **A**?

(Total for Question 20 is 4 marks)



21 y is directly proportional to the square of x .

$$y = 80 \text{ when } x = 4$$

(a) Find a formula for y in terms of x .

.....
(3)

(b) Work out the value of y when $x = 7$

.....
(1)

(c) Work out the values of x for which $y = 45$

.....
(2)

(Total for Question 21 is 6 marks)



*22 Prove algebraically that $0.\dot{4}\dot{5} = \frac{5}{11}$

You must show your working.

(Total for Question 22 is 3 marks)



23

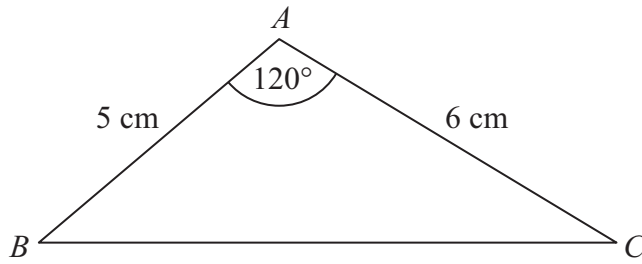


Diagram **NOT** accurately drawn

Calculate the length of the side BC .
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 23 is 3 marks)

***24** Prove that

$$(7n + 3)^2 - (7n - 3)^2$$

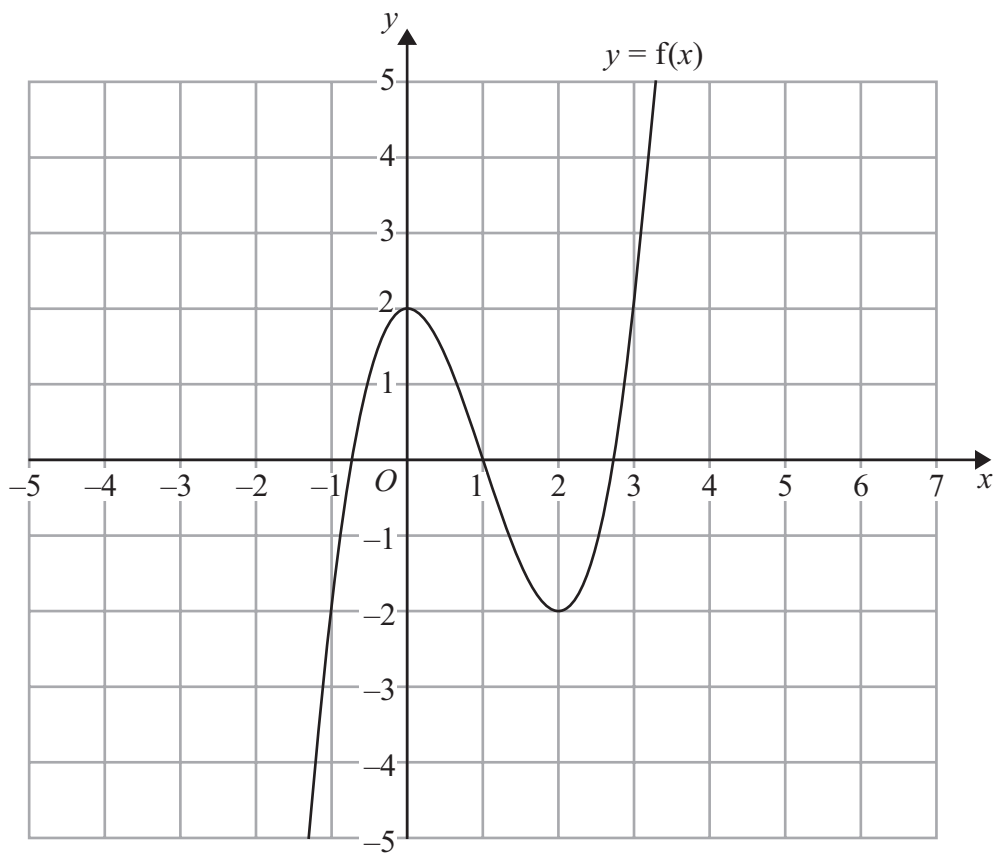
is a multiple of 12, for all positive integer values of n .

(Total for Question 24 is 3 marks)



25 The graph of $y = f(x)$ is shown on the grids.

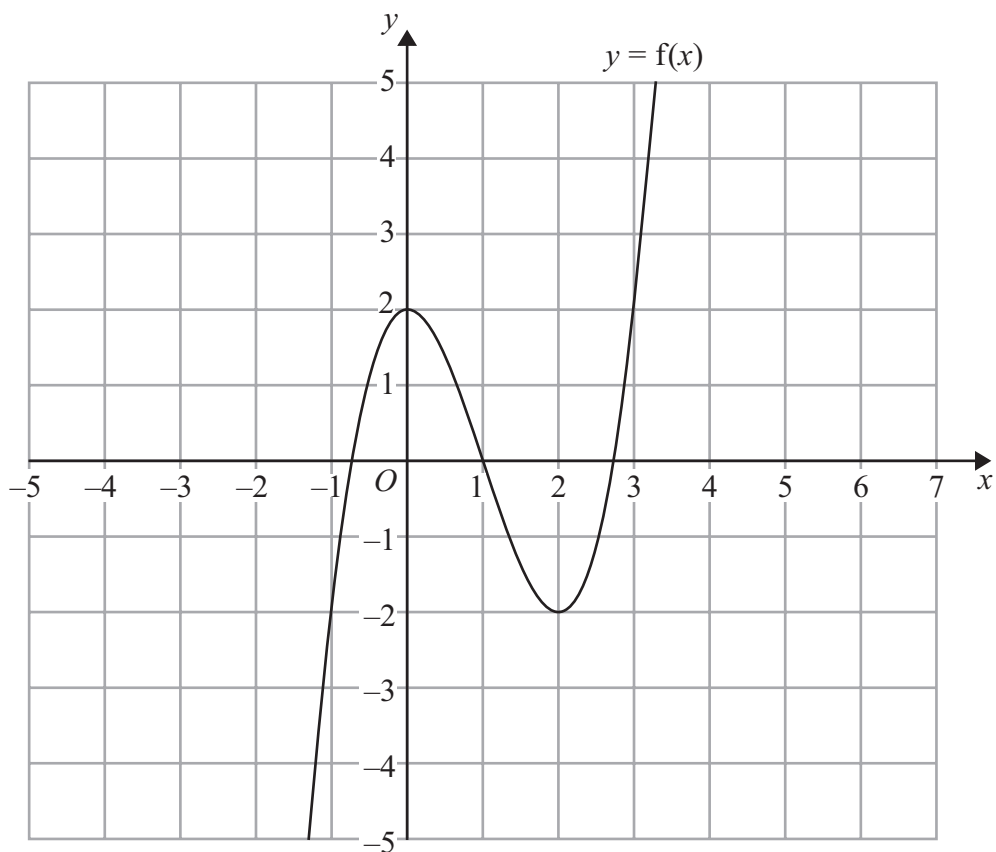
(a) On this grid, sketch the graph of $y = f(x + 1)$



(2)



(b) On this grid, sketch the graph of $y = 2f(x)$



(2)

(Total for Question 25 is 4 marks)



*26

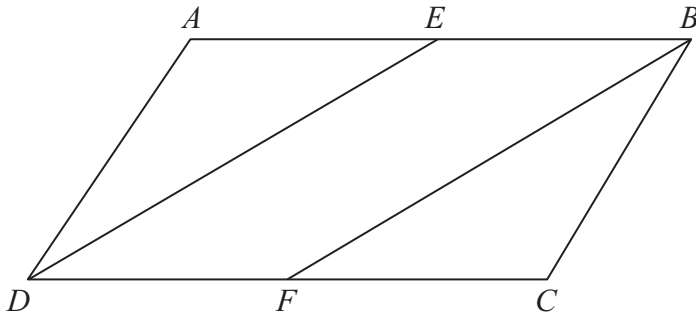


Diagram **NOT**
accurately drawn

$ABCD$ is a parallelogram.
 E is the midpoint of AB .
 F is the midpoint of DC .

(a) Prove that triangle AED is congruent to triangle CFB .

(3)

(b) Hence, prove that $DE = FB$

(1)

(Total for Question 26 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS



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