

# 81 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# FUNCTIONAL MATHS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### Instructions

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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.

### Information

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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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### Advice

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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.

1. The diagram shows a patio in the shape of a rectangle.

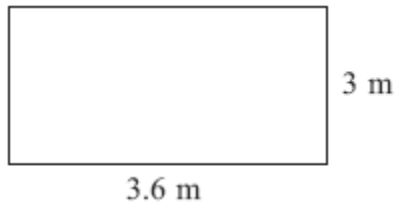


Diagram **NOT**  
accurately drawn

The patio is 3.6 m long and 3 m wide.

Matthew is going to cover the patio with paving slabs.  
Each paving slab is a square of side 60 cm.

Matthew buys 32 of the paving slabs.

- (a) Does Matthew buy enough paving slabs to cover the patio?  
You must show all your working.

.....  
(3)

The paving slabs cost £8.63 each.

- (b) Work out the total cost of the 32 paving slabs.

£ .....  
(3)

**(6 marks)**

\*2. Mr Weaver's garden is in the shape of a rectangle.

In the garden

there is a patio in the shape of a rectangle  
and two ponds in the shape of circles with diameter 3.8 m.

The rest of the garden is grass.

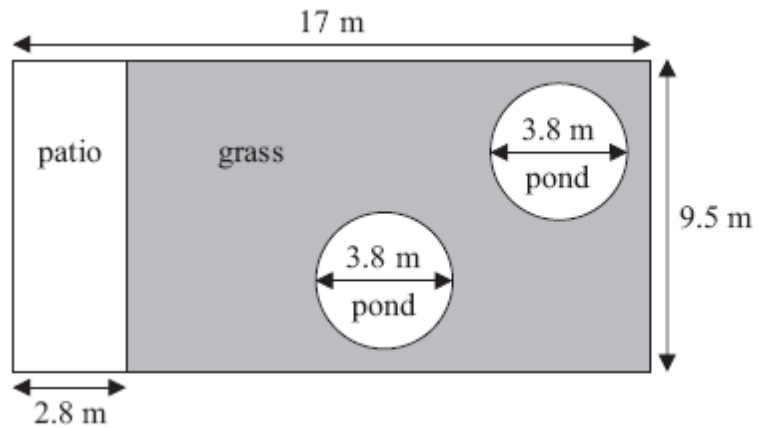


Diagram **NOT**  
accurately drawn

Mr Weaver is going to spread fertiliser over all the grass.  
One box of fertiliser will cover 25 m<sup>2</sup> of grass.

How many boxes of fertiliser does Mr Weaver need?  
You must show your working.

(5 marks)

\*3. Henry is thinking about having a water meter.

These are the two ways he can pay for the water he uses.

**Water Meter**

A charge of £28.20 per year

**plus**

91.22p for every cubic metre of water used

**1 cubic metre = 1000 litres**

**No Water Meter**

A charge of £107 per year

Henry uses an average of 180 litres of water each day.

Henry wants to pay as little as possible for the water he uses.  
Should Henry have a water meter?

**(5 marks)**

---

\*4. Here is part of Gary's electricity bill.

<b>Electricity bill</b>	
New reading	7155 units
Old reading	7095 units
Price per unit 15p	

Work out how much Gary has to pay for the units of electricity he used.

**(4 marks)**

---

5. Peter works out the cost of the gas he used last year.  
At the start of the year, the gas meter reading was 12967 units.  
At the end of the year, the gas meter reading was 14059 units.  
Each unit of gas he used cost 44p.

Work out the mean cost per month of the gas he used last year.

£ .....

**(5 marks)**

6. Here is a diagram of Jim's garden.

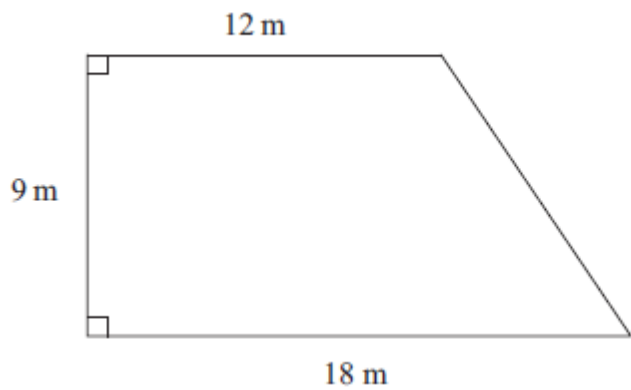


Diagram **NOT**  
accurately drawn

Jim wants to cover his garden with grass seed to make a lawn.

Grass seed is sold in bags.

There is enough grass seed in each bag to cover  $20 \text{ m}^2$  of garden.

Each bag of grass seed costs £4.99

Work out the least cost of putting grass seed on Jim's garden.

£ .....

**(5 marks)**

7. Jon has a flower garden in the shape of a circle.  
The diameter of the garden is 5 metres.

Jon wants to put fencing around the edge of the garden.  
The fencing costs £1.80 per metre.

Work out the total cost of the fencing.

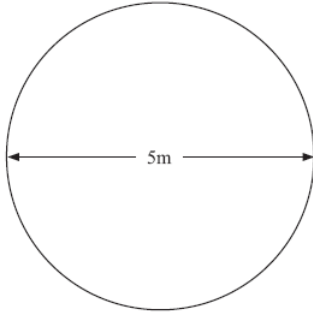


Diagram NOT  
accurately drawn

£.....

**(5 marks)**

- 
8. The diagram shows a CD.  
The CD is a circle of radius 6 cm.

CDs of this size are cut from rectangular sheets of plastic.  
Each sheet is 1 metre long and 50 cm wide.

Work out the greatest number of CDs that can be cut from one rectangular sheet.

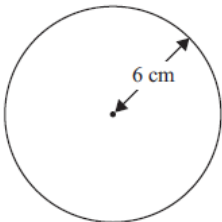


Diagram NOT  
accurately drawn

.....

**(4 marks)**

\*9. Jenny fills some empty flowerpots completely with compost.

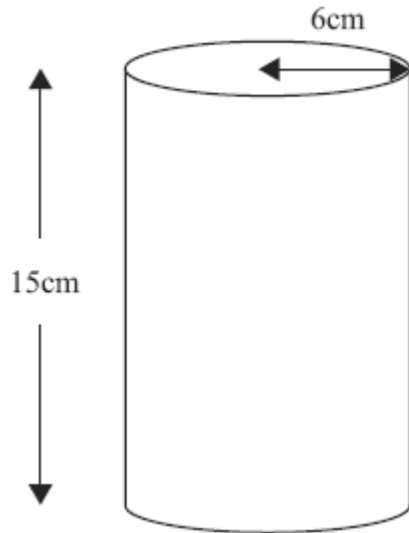


Diagram **NOT** accurately drawn

Each flowerpot is in the shape of a cylinder of height 15 cm and radius 6 cm.  
She has a 15 litre bag of compost.

She fills up each flowerpot completely.  
How many flowerpots can she fill completely?  
You must show your working.

.....  
**( 6 marks)**



# 82 Edexcel GCSE Mathematics (Linear) – 1MA0

# STANDARD FORM

## Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

## Items included with question papers

Nil



## Instructions

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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.

## Information

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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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

## Advice

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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.

1. (a) Write the number 0.00037 in standard form.

(1)

.....

(b) Write  $8.25 \times 10^3$  as an ordinary number.

(1)

.....

(c) Work out  $(2.1 \times 10^8) \times (6 \times 10^{-5})$ .  
Write your answer in standard form.

(2)

.....

**(4 marks)**

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2. (a) Write  $6.43 \times 10^5$  as an ordinary number.

(1)

.....

(b) Work out the value of  $2 \times 10^7 \times 8 \times 10^{-12}$   
Give your answer in standard form.

(2)

.....

**(3 marks)**

---

3. (a) Write down the value of  $10^0$

.....  
(1)

(b) Write  $6.7 \times 10^{-5}$  as an ordinary number.

.....  
(1)

(c) Work out the value of  $(3 \times 10^7) \times (9 \times 10^6)$   
Give your answer in standard form.

.....  
(2)

**(4 marks)**

---

4. (a) Write  $8.2 \times 10^5$  as an ordinary number.

.....  
(1)

(b) Write 0.000 376 in standard form.

.....  
(1)

(c) Work out the value of  $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$   
Give your answer in standard form.

.....  
(2)

**(4 marks)**

---

5. A floppy disk can store 1 440 000 bytes of data.

(a) Write the number 1 440 000 in standard form.

.....

**(1)**

A hard disk can store  $2.4 \times 10^9$  bytes of data.

(b) Calculate the number of floppy disks needed to store the  $2.4 \times 10^9$  bytes of data.

.....

**(3)**

**(4 marks)**

6. (a) (i) Write 40 000 000 in standard form.

.....

(ii) Write  $3 \times 10^{-5}$  as an ordinary number.

.....

**(2)**

(b) Work out the value of

$$3 \times 10^{-5} \times 40\,000\,000$$

Give your answer in standard form.

.....

**(2)**

**(4 marks)**

7. (a) Write the number 40 000 000 in standard form.
- ..... (1)
- (b) Write  $1.4 \times 10^{-5}$  as an ordinary number.
- ..... (1)
- (c) Work out
- $$(5 \times 10^4) \times (6 \times 10^9)$$
- Give your answer in standard form.
- ..... (2)
- (4 marks)**
- 

8. (a) Write  $6.4 \times 10^4$  as an ordinary number.
- ..... (1)
- (b) Write 0.0039 in standard form.
- ..... (1)
- (c) Write  $0.25 \times 10^7$  in standard form.
- ..... (1)
- (d) Work out  $(3.2 \times 10^5) \times (4.5 \times 10^4)$  in standard form.
- ..... (2)
- (5 marks)**
-

9. (a) (i) Write 7900 in standard form.

.....

(ii) Write 0.00035 in standard form.

.....

(2)

(b) Work out  $\frac{4 \times 10^3}{8 \times 10^{-5}}$

Give your answer in standard form.

.....

(2)  
(4 marks)

---

10. (a) Write 30 000 000 in standard form.

.....

(1)

(b) Write  $2 \times 10^{-3}$  as an ordinary number.

.....

(1)  
(2 marks)

---

11. (a) Write  $5.7 \times 10^{-4}$  as an ordinary number.

.....

(1)

(b) Work out the value of  $(7 \times 10^4) \times (3 \times 10^5)$

Give your answer in standard form.

.....

(2)  
(3 marks)

---

12. Write the following numbers in order of size.  
Start with the smallest number.

$$0.038 \times 10^2 \quad 3800 \times 10^{-4} \quad 380 \quad 0.38 \times 10^{-1}$$

.....  
**(2 marks)**

- 
13. The time taken for light to reach Earth from the edge of the known universe is 14 000 000 000 years.

Light travels at the speed of  $9.46 \times 10^{12}$  km/year.

Work out the distance, in kilometres, from the edge of the known universe to Earth.  
Give your answer in standard form.

..... km  
**(3 marks)**

- 
14. The surface area of Earth is 510 072 000 km<sup>2</sup>.  
The surface area of Jupiter is  $6.21795 \times 10^{10}$  km<sup>2</sup>.

The surface area of Jupiter is greater than the surface area of Earth.  
How many times greater?  
Give your answer in standard form.

.....  
**(3 marks)**

15. 
$$p^2 = \frac{x-y}{xy}$$

$x = 8.5 \times 10^9$   
 $y = 4 \times 10^8$

Find the value of  $p$ .

Give your answer in standard form correct to 2 significant figures.

.....  
**(4 marks)**

---

16.

$$y^2 = \frac{ab}{a+b}$$

$a = 3 \times 10^8$   
 $b = 2 \times 10^7$

Find  $y$ .

Give your answer in standard form correct to 2 significant figures.

$y = \dots\dots\dots$   
**(4 marks)**

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# 83 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# COMPOUND INTEREST AND DEPRECIATION

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### Instructions

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Use black ink or ball-point pen.

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Answer all questions.

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Calculators may be used.

### Information

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### Advice

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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.

1. Toby invested £4500 for 2 years in a savings account.  
He was paid 4% per annum compound interest.

How much did Toby have in his savings account after 2 years?

£ .....

**(Total 3 marks)**

2. The value of a car depreciates by 35% each year.

At the end of 2007 the value of the car was £5460

Work out the value of the car at the end of 2006

£ .....

**(Total 3 marks)**

3. Mario invests £2000 for 3 years at 5% per annum **compound** interest.  
Calculate the value of the investment at the end of 3 years.

£.....

**(Total 3 marks)**

4. Derek invests £154 500 for 2 years at 4% per year compound interest.  
Work out the value of the investment at the end of 2 years.

£.....

**(3)**

**(Total 3 marks)**

5. Henry invests £4500 at a compound interest rate of 5% per annum.

At the end of  $n$  complete years the investment has grown to £5469.78.

Find the value of  $n$ .

.....

**(Total 2 marks)**

6. A company bought a van that had a value of £12 000

Each year the value of the van depreciates by 25%.

Work out the value of the van at the end of three years.

£ .....

**(3)**

**(Total 3 marks)**

7. Bill invests £500 on 1st January 2004 at a compound interest rate of  $R\%$  per annum.  
The value, £ $V$ , of this investment after  $n$  years is given by the formula

$$V = 500 \times (1.045)^n$$

- (a) Write down the value of  $R$ .

$$R = \dots\dots\dots \quad (1)$$

- (b) Use your calculator to find the value of Bill's investment after 20 years.

$$\text{£} \dots\dots\dots \quad (2)$$

**(Total 3 marks)**

8. Gwen bought a new car.  
Each year, the value of her car depreciated by 9%.

Calculate the number of years after which the value of her car was 47% of its value when new.

.....  
**(Total 3 marks)**

9. Liam invests £6200 for 3 years in a savings account.  
He gets 2.5% per annum compound interest.

How much money will Liam have in his savings account at the end of 3 years?

£ .....

**(Total 3 marks)**

**10.** Toby invested £4500 for 2 years in a savings account.  
He was paid 4% per annum compound interest.

(a) How much did Toby have in his savings account after 2 years?

£ .....  
**(3)**

Jaspir invested £2400 for  $n$  years in a savings account.  
He was paid 7.5% per annum compound interest.

At the end of the  $n$  years he had £3445.51 in the savings account.

(b) Work out the value of  $n$ .

.....  
**(2)**

**(Total 5 marks)**

**\*11** Viv wants to invest £2000 for 2 years in the same bank.

<p><b>The International Bank</b></p> <p>Compound Interest</p> <p>4% for the first year</p> <p>1% for each extra year</p>
--

<p><b>The Friendly Bank</b></p> <p>Compound Interest</p> <p>5% for the first year</p> <p>0.5% for each extra year</p>
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At the end of 2 years, Viv wants to have as much money as possible.

Which bank should she invest her £2000 in?

**(Total 4 marks)**



# 84 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# REVERSE

# PERCENTAGES

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

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### Advice

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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.

1. In a sale, normal prices are reduced by 20%.



Andrew bought a saddle for his horse in the sale.  
The sale price of the saddle was £220.

Calculate the normal price of the saddle.

£.....

**(Total 3 marks)**

2.



Jacob answered 80% of the questions in a test correctly.  
He answered 32 of the questions correctly.

Work out the total number of questions in the test.

.....  
**(Total 3 marks)**

3. In a sale, normal prices are reduced by 15%.  
The sale price of a CD player is £102

Work out the normal price of the CD player.

£.....

**(Total 3 marks)**

4. A garage sells cars.  
It offers a discount of 20% off the normal price for cash.

Dave pays £5200 cash for a car.

Calculate the normal price of the car.

£ .....

**(Total 3 marks)**

5. In a sale, normal prices are reduced by 25%.  
The sale price of a saw is £12.75

Calculate the normal price of the saw.

£ .....

**(Total 3 marks)**

6. In a sale, normal prices are reduced by 12%.  
The sale price of a DVD player is £242.

Work out the normal price of the DVD player.

£ .....

**(Total 3 marks)**

7. The price of all rail season tickets to London increased by 4%.

(a) The price of a rail season ticket from Cambridge to London increased by £121.60

Work out the price before this increase.

£ .....

**(2)**

(b) After the increase, the price of a rail season ticket from Brighton to London was £2828.80

Work out the price before this increase.

£ .....

**(3)**

**(Total 5 marks)**

# 85 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# ALGEBRA:

# EXPAND & FACTORISE

# QUADRATICS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

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### 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.

1. (a) Factorise fully  $2x^2 - 4xy$

.....  
(2)

(b) Factorise  $p^2 - 6p + 8$

.....  
(2)

(c) Simplify  $\frac{(x+2)^2}{x+2}$

.....  
(1)

(d) Factorise  $x^2 - 100$

.....  
(2)

**(7 marks)**

---

2. (a) Simplify  $x^5 \times x^4$

.....  
(1)

(b) Simplify  $y^7 \div y^2$

.....  
(1)

(c) Expand and simplify  $3(2a + 5) + 5(a - 2)$

.....  
(2)

(d) Expand and simplify  $(y + 5)(y + 7)$

.....  
(2)

(e) Factorise  $p^2 - 6p + 5$

.....  
(2)

**(8 marks)**

---



3. (a) Expand and simplify  $(p + 9)(p - 4)$

.....  
(2)

(b) Factorise  $x^2 - 11x + 18$

.....  
(2)

(c) Factorise  $x^2 - 49$

.....  
(2)

(d) Simplify  $(9x^8y^3)^{\frac{1}{2}}$

.....  
(2)

**(8 marks)**

---

4. (a) Expand  $3(2y - 5)$

.....  
(1)

(b) Factorise completely  $8x^2 + 4xy$

.....  
(2)

(c) Expand and simplify  $(p + 7)(p - 8)$

.....  
(2)

(d) Factorise  $x^2 - 169$

.....  
(2)

**(7 marks)**

---

5. (a) Expand  $4(3x + 5)$

.....  
(1)

(b) Expand and simplify  $3(x - 4) - 2(x + 5)$

.....  
(2)

(c) Expand and simplify  $(x + 4)(x + 6)$

.....  
(2)

**(5 marks)**

---

6. (a) Factorise  $x^2 + 7x$

.....  
(1)

(b) Factorise  $y^2 - 10y + 16$

.....  
(2)

(c) Solve  $y^2 - 10y + 16 = 0$

.....  
(2)

**(5 marks)**

---

7. (a) Expand and simplify  $3(x + 4) + 2(5x - 1)$

.....  
(2)

(b) Expand and simplify  $(2x + 1)(x - 4)$

.....  
(2)

(c) Factorise completely  $6y^2 - 9xy$

.....  
(2)

**(6 marks)**

---

8. (a) Expand  $x(x + 2)$

.....  
(2)

(b) Expand and simplify  $(x + 3)(x - 4)$

.....  
(2)

(c) Factorise completely  $2y^2 - 4y$

.....  
(2)

(d) Factorise  $x^2 - 9$

.....  
(2)

**(8 marks)**

---

9. (a) Expand and simplify  $(3x + 5)(4x - 1)$

.....  
(2)

(b) Factorise  $x^2 - 3x - 10$

.....  
(2)

(c) Solve  $x^2 - 3x - 10 = 0$

$x =$  .....  
(2)

**(6 marks)**

---

10. (a) Expand  $3(4x + y)$

(2)

(b) Expand  $5p(p - 3)$

.....  
(1)

(c) Expand and simplify  $(y + 8)(y - 3)$

.....  
(2)

(d) Expand and simplify  $(2t - 3)^2$

.....  
(2)

.....  
**(7 marks)**

---

11. (a) Factorise fully  $6y^2 + 12y$  (2)

(b) Factorise  $k^2 + 13k + 30$  (2)

(c) Solve  $k^2 + 13k + 30 = 0$  (2)

---

**(6 marks)**

12. (a) Factorise  $5x - 10$  (1)

(b) Factorise fully  $2p^2 - 4pq$  (1)

(c) Expand and simplify  $(t + 5)(t - 4)$  (2)

(d) Factorise  $x^2 + 17x + 60$  (2)

(e) Factorise  $x^2 - 144$  (2)

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**(9 marks)**

13. (a) Factorise  $8x - 20$

.....  
(1)

(b) Factorise fully  $10x^2 - 15xy$

.....  
(2)

(c) Factorise  $x^2 - 64$

.....  
(2)

(d) Expand and simplify  $(x + 7)(x - 5)$

.....  
(2)

(e) Factorise  $x^2 + 2x - 15$

.....  
(2)

(f) Solve  $x^2 + 2x - 15 = 0$

.....  
(2)  
**(11 marks)**

# 86 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# SOLVING QUADRATICS BY FACTORISING

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### Instructions

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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.

### Information

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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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### 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.

1. (i) Factorise  $x^2 - 4x - 45$

.....

(ii) Solve the equation

$$x^2 - 4x - 45 = 0$$

.....

**(Total 3 marks)**

2. (i) Factorise  $x^2 - 7x + 12$

.....

(ii) Solve the equation

$$x^2 - 7x + 12 = 0$$

.....

**(Total 3 marks)**



3. (a) Factorise  $x^2 - 3x - 18$

..... (2)

(b) Solve  $x^2 - 3x - 18 = 0$

$x =$ .....

or  $x =$ ..... (1)

**(Total 3 marks)**

4. (a) Factorise  $x^2 + 6x + 8$

..... (2)

(b) Solve  $x^2 + 6x + 8 = 0$

$x =$ .....

or  $x =$ ..... (1)

**(Total 3 marks)**

5. (a) Factorise  $x^2 - x - 56$

..... (2)

(b) Solve  $x^2 - x - 56 = 0$

$x =$ .....

or  $x =$ .....

(1)

**(Total 3 marks)**

6. (i) Factorise  $x^2 + 9x + 20$

.....

(ii) Solve the equation

$$x^2 + 9x + 20 = 0$$

.....

**(Total 3 marks)**

7. (i) Factorise  $x^2 - 12x + 35$

.....

(ii) Solve the equation

$$x^2 - 12x + 35 = 0$$

.....

**(Total 3 marks)**

8. (i) Factorise  $x^2 - x - 72$

.....

(ii) Solve the equation

$$x^2 - x - 72 = 0$$

.....

**(Total 3 marks)**

9. (a) Factorise  $x^2 - 15x + 56$

..... (2)

(b) Solve  $x^2 - 15x + 56 = 0$

$x =$ .....

or  $x =$ ..... (1)

**(Total 3 marks)**

10. (a) Factorise  $x^2 + 9x + 18$

..... (2)

(b) Solve  $x^2 + 9x + 18 = 0$

$x =$ .....

or  $x =$ ..... (1)

**(Total 3 marks)**

11. (a) Factorise  $x^2 - 2x - 48$

..... (2)

(b) Solve  $x^2 - 2x - 48 = 0$

$x =$ .....

or  $x =$ ..... (1)

**(Total 3 marks)**

12. (i) Factorise  $x^2 + 10x + 24$

.....

(ii) Solve the equation

$$x^2 + 10x + 24 = 0$$

.....  
**(Total 3 marks)**

13.

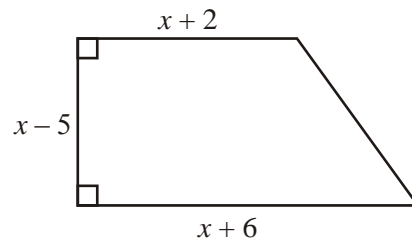


Diagram **NOT**  
accurately drawn

The diagram shows a trapezium.

The lengths of three of the sides of the trapezium are  $x - 5$ ,  $x + 2$  and  $x + 6$ .  
All measurements are given in centimetres.

The area of the trapezium is  $36 \text{ cm}^2$ .

(a) Show that  $x^2 - x - 56 = 0$

(4)

(b) (i) Solve the equation  $x^2 - x - 56 = 0$

.....

(ii) Hence find the length of the shortest side of the trapezium.

..... cm

(4)

**(Total 8 marks)**

# 87 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# SIMULTANEOUS EQUATIONS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

---

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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### 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.

1. Solve the simultaneous equations

$$3x + 2y = 4$$

$$4x + 5y = 17$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

**(4 marks)**



2. Solve the equations

$$3x + 5y = 19$$

$$4x - 2y = -18$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

**(4 marks)**

3. Solve the simultaneous equations

$$3x + 4y = 200$$

$$2x + 3y = 144$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

**(4 marks)**

4. Solve the simultaneous equations

$$5x + 2y = 11$$

$$4x - 3y = 18$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

**(4 marks)**

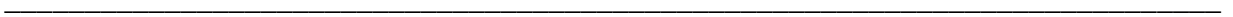
5. Solve the simultaneous equations

$$\begin{aligned}4x - 3y &= 11 \\10x + 2y &= -1\end{aligned}$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

**(4 marks)**



6. Solve the simultaneous equations

$$3x + 7y = 26$$

$$4x + 5y = 13$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(4 marks)**

---

7. Solve the simultaneous equations

$$6x - 2y = 33$$

$$4x + 3y = 9$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(4 marks)**



# 88 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# INEQUALITIES

# REGIONS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

---

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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### Advice

---

Read each question carefully before you start to answer it.

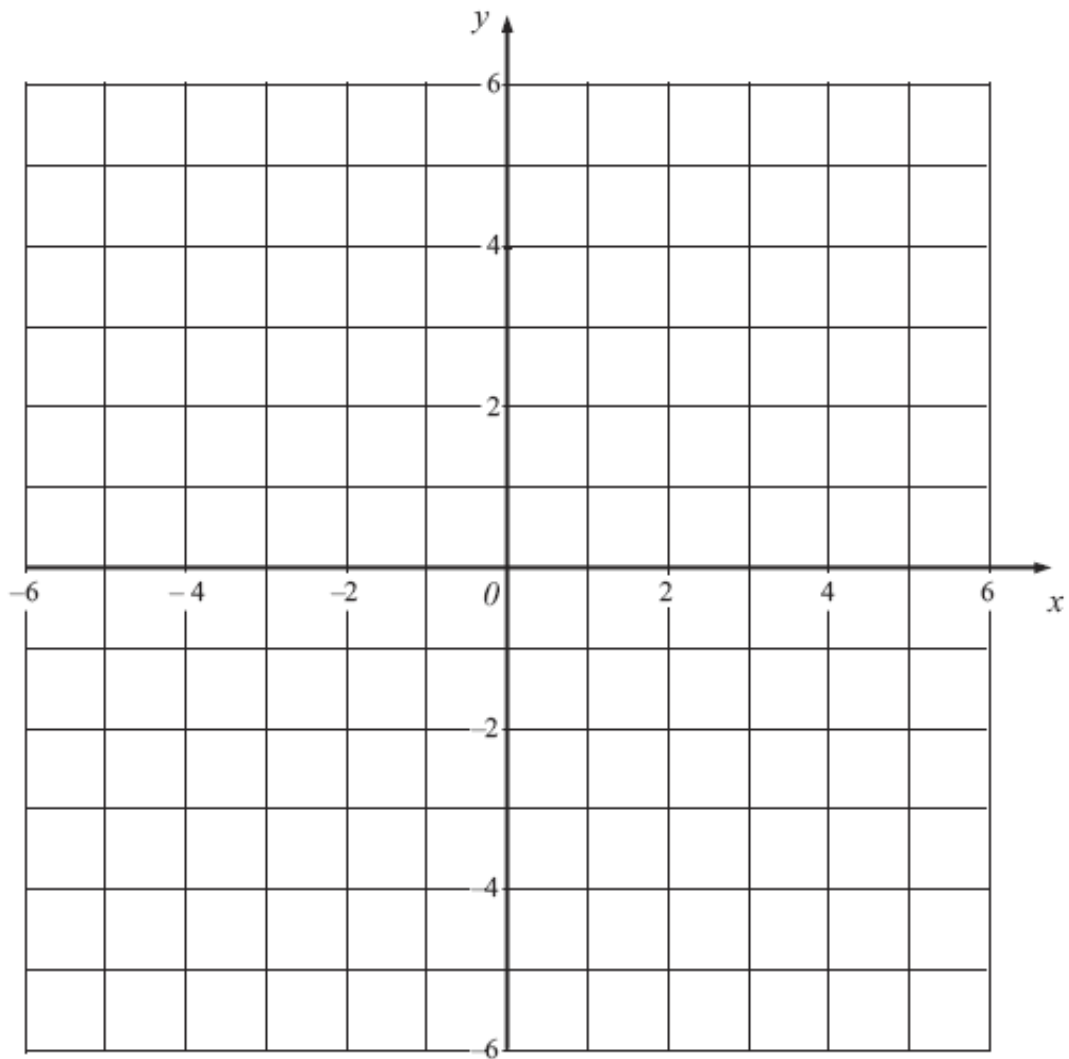
Keep an eye on the time.

Try to answer every question.

Check your answers if you have time at the end.

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

$$y > -4 \quad x < 2 \quad y < 2x + 1$$



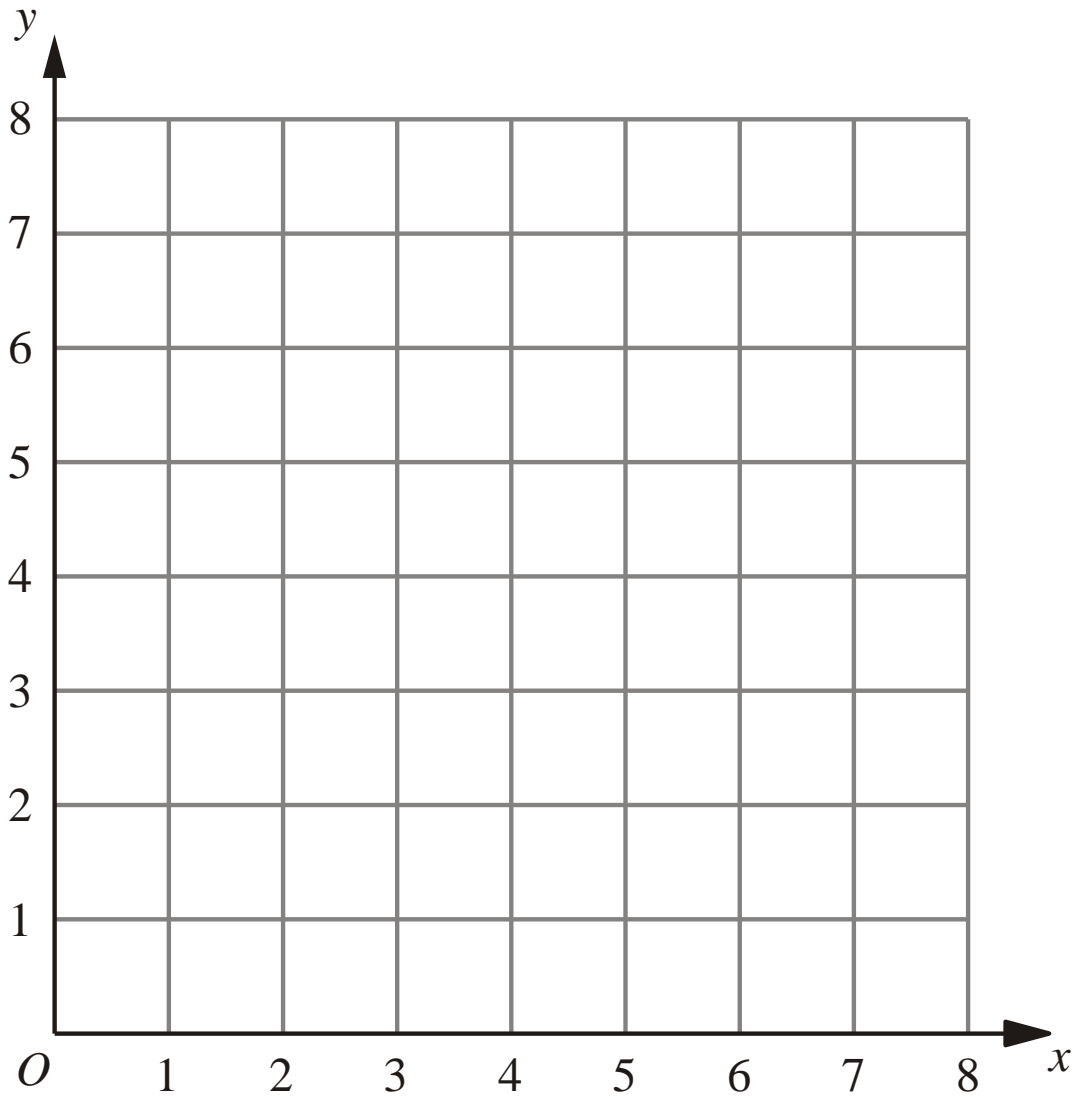
**(Total for Question 19 = 4 marks)**



2. The region **R** satisfies the inequalities

$$x \geq 2, \quad y \geq 1, \quad x + y \leq 6$$

On the grid below, draw straight lines and use shading to show the region **R**.



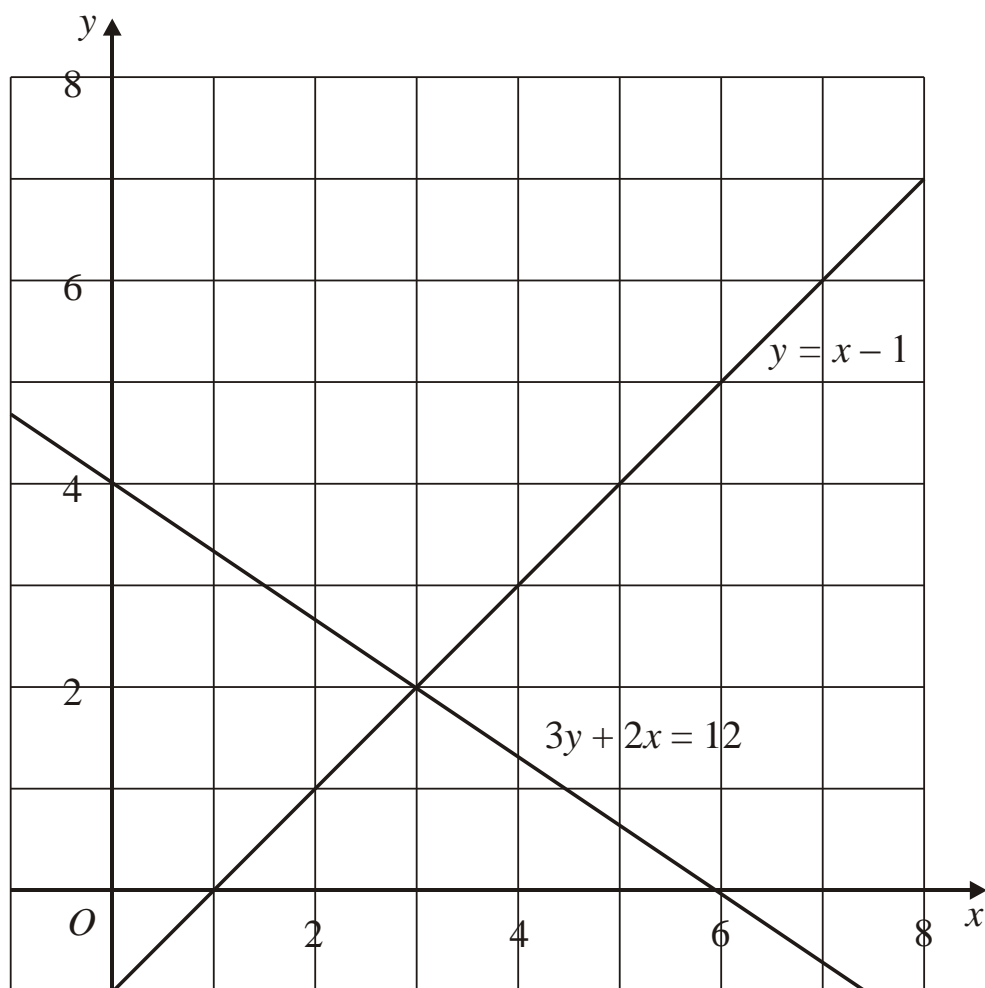
(Total 3 marks)

3. The graphs of the straight lines with equations

$$3y + 2x = 12 \quad \text{and}$$

$$y = x - 1$$

have been drawn on the grid.



$$3y + 2x > 12$$

$$y < x - 1$$

$$x < 6$$

$x$  and  $y$  are integers.

On the grid, mark with a cross ( $\times$ ), each of the **four** points which satisfies **all** 3 inequalities.

**(Total 3 marks)**

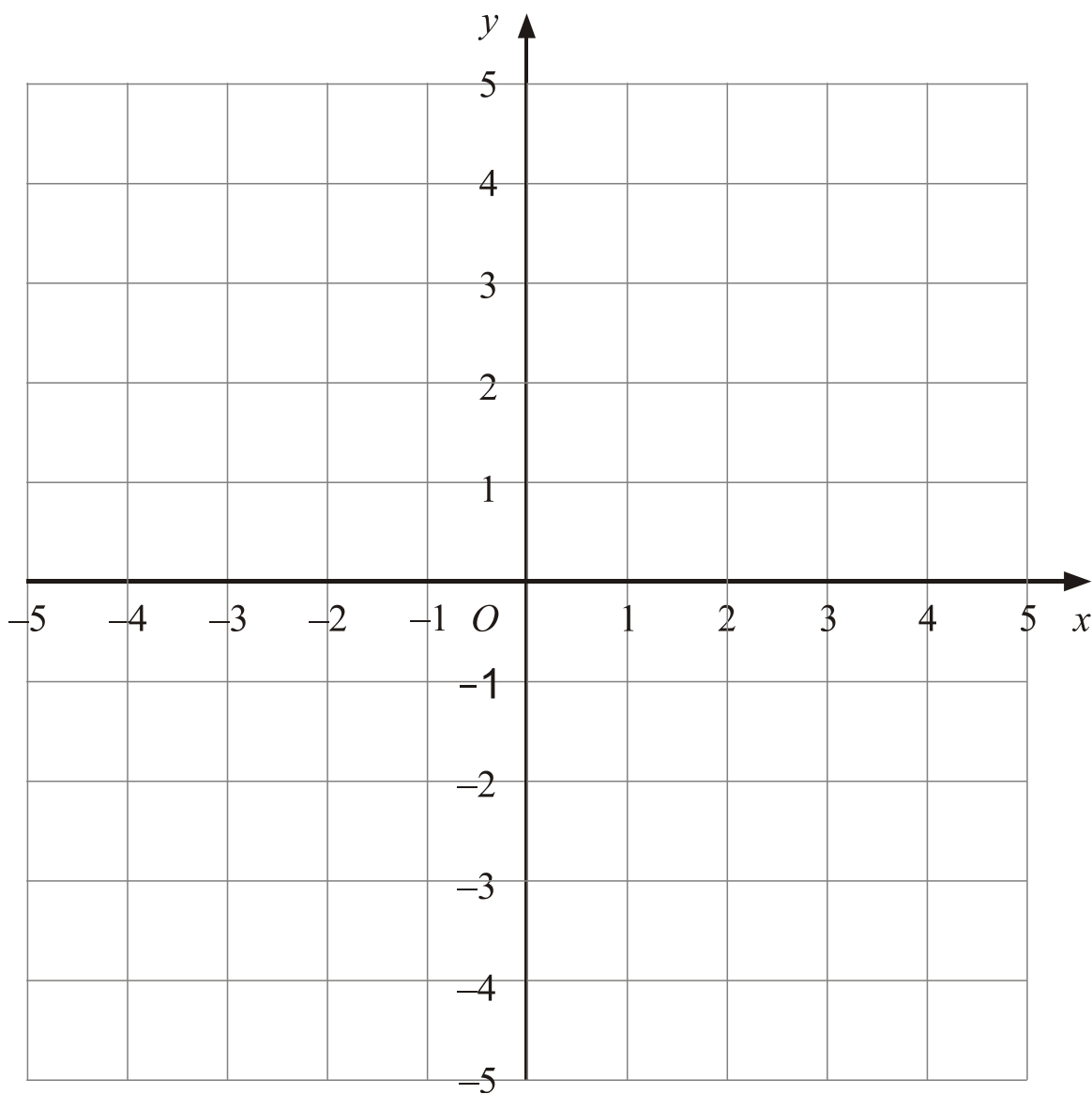
4. On the grid, show by shading, the region which satisfies all three of the inequalities.

$$x < 3$$

$$y > -2$$

$$y < x$$

Label the region **R**.

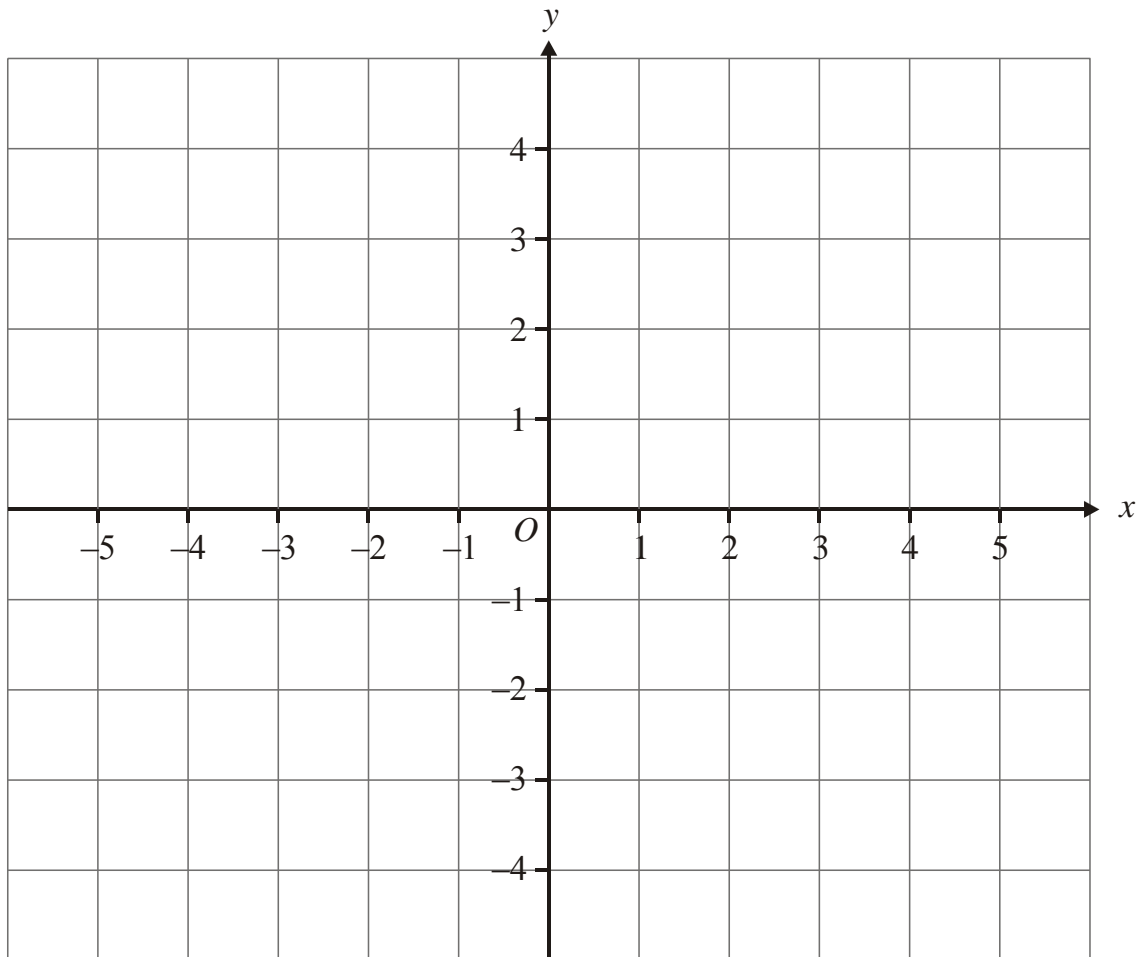


**(Total 4 marks)**

5.  $-2 < x \leq 1$      $y > -2$      $y < x + 1$

$x$  and  $y$  are integers.

On the grid, mark with a cross (**x**), each of the six points which satisfies **all** these 3 inequalities.



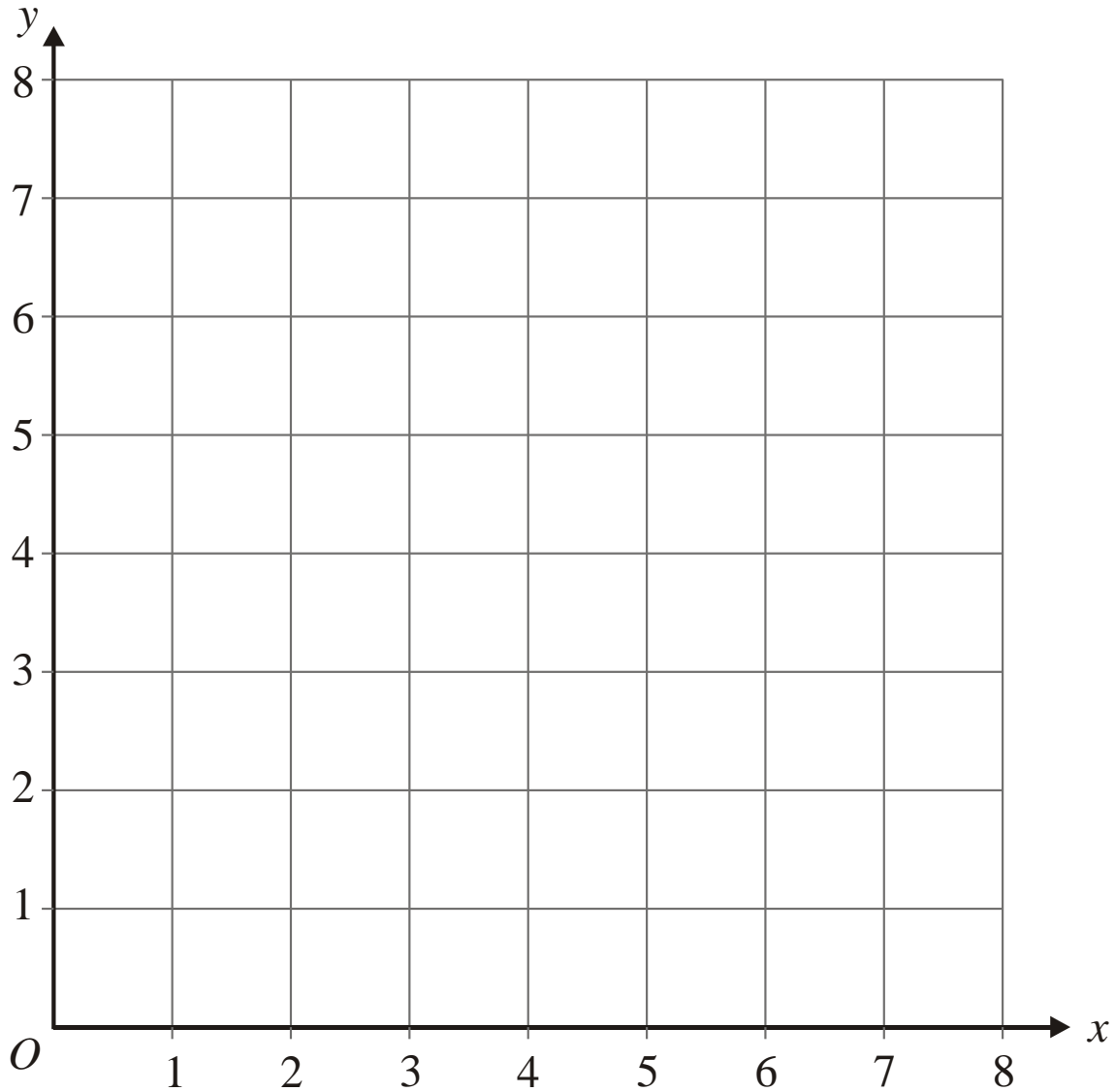
**(Total 3 marks)**

6. (a) On the grid below, draw straight lines and use shading to show the region **R** that satisfies the inequalities

$$x \geq 2$$

$$y \geq x$$

$$x + y \leq 6$$



(3)

The point  $P$  with coordinates  $(x, y)$  lies inside the region **R**.  
 $x$  and  $y$  are **integers**.

- (b) Write down the coordinates of **all** the points of **R** whose coordinates are both integers.

.....

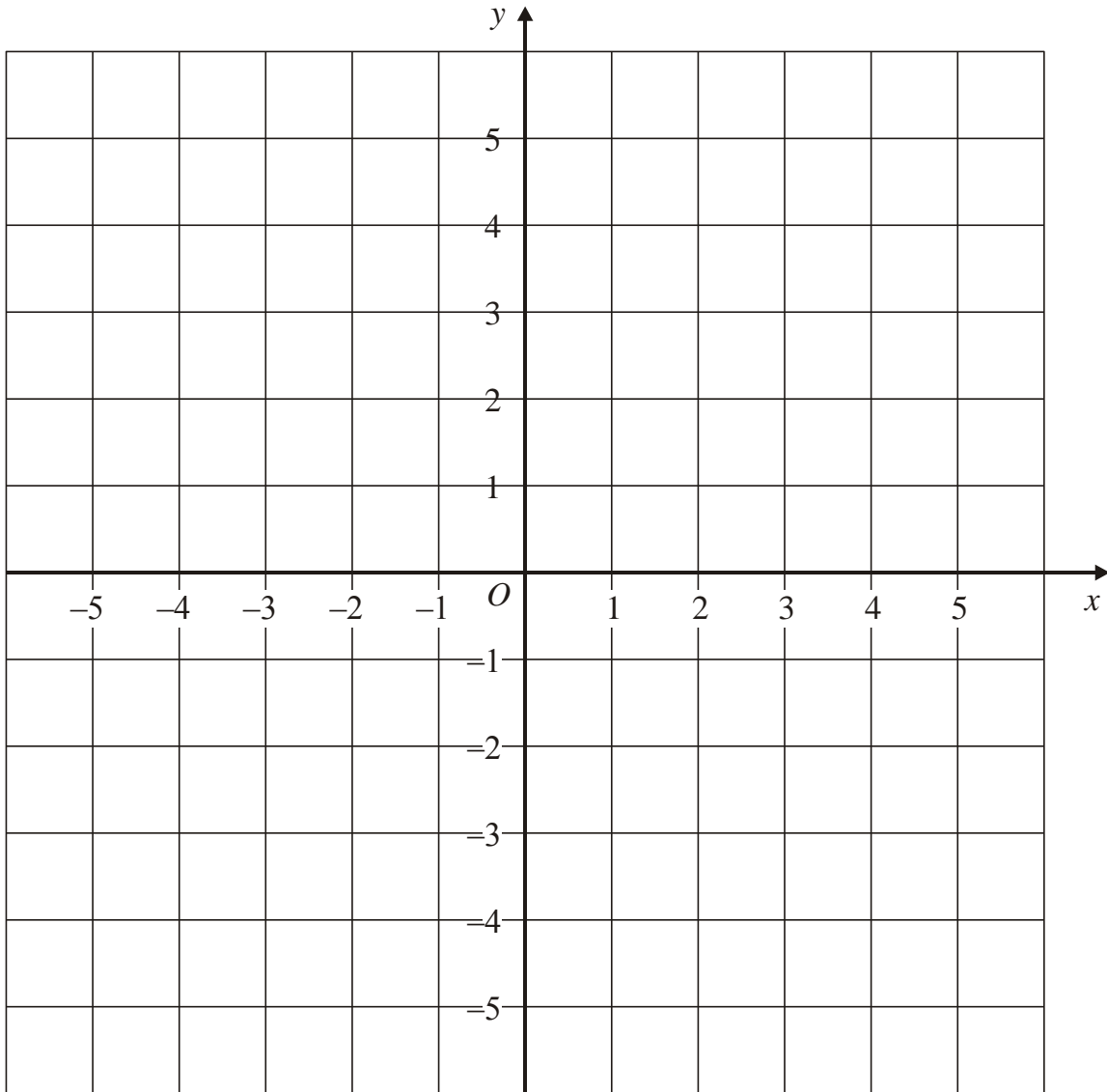
(2)

(Total 5 marks)

7.  $4x + 3y < 12$ ,  $y < 3x$ ,  $y > 0$ ,  $x > 0$

$x$  and  $y$  are both integers.

On the grid, mark with a cross ( $\times$ ), each of the **three** points which satisfy **all** these four inequalities.



(3)  
(Total 5 marks)

# 89 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# TRIGONOMETRY

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

---

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### 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.

1.

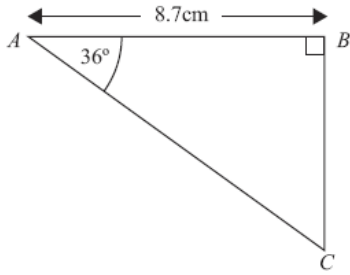


Diagram NOT accurately drawn

$ABC$  is a right-angled triangle.

Angle  $B = 90^\circ$ .

Angle  $A = 36^\circ$ .

$AB = 8.7$  cm.

Work out the length of  $BC$ .

Give your answer correct to 3 significant figures.

..... cm  
**(3 marks)**

2.

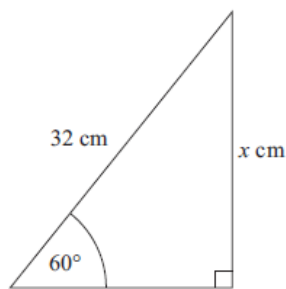


Diagram NOT accurately drawn

Calculate the value of  $x$ .

Give your answer correct to 3 significant figures.

.....  
**(3 marks)**



3.

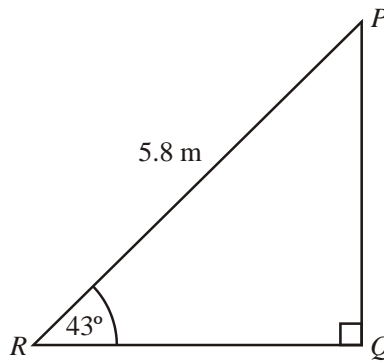


Diagram **NOT** accurately drawn

$PQR$  is a triangle.  
Angle  $Q = 90^\circ$ .  
Angle  $R = 43^\circ$ .  
 $PR = 5.8\text{ m}$ .

Calculate the length of  $QR$ .  
Give your answer correct to 3 significant figures.

..... m

**(3 marks)**

4.

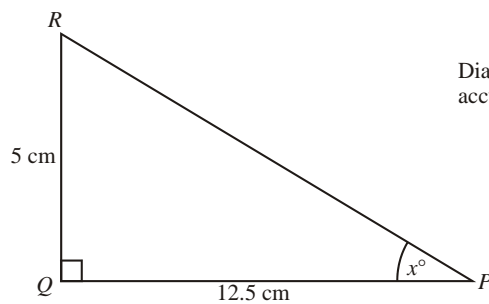


Diagram **NOT** accurately drawn

$PQR$  is a triangle.  
Angle  $PQR = 90^\circ$ .  
 $PQ = 12.5\text{ cm}$ .  
 $QR = 5\text{ cm}$ .

Calculate the value of  $x$ .  
Give your answer correct to 1 decimal place.

.....

**(3 marks)**

5.

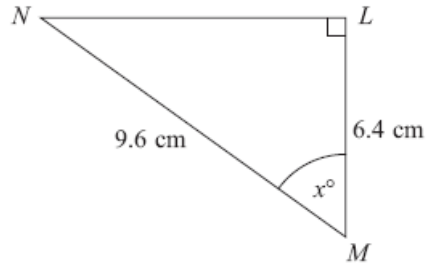


Diagram **NOT** accurately drawn

$LMN$  is a right-angled triangle.  
 $MN = 9.6 \text{ cm}$ .  
 $LM = 6.4 \text{ cm}$ .

Calculate the size of the angle marked  $x^\circ$ .  
Give your answer correct to 1 decimal place.

.....<sup>o</sup>  
**(3 marks)**

6.

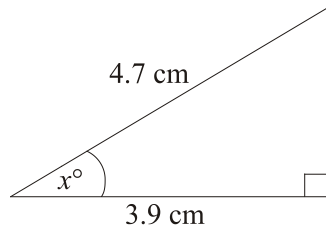


Diagram **NOT** accurately drawn

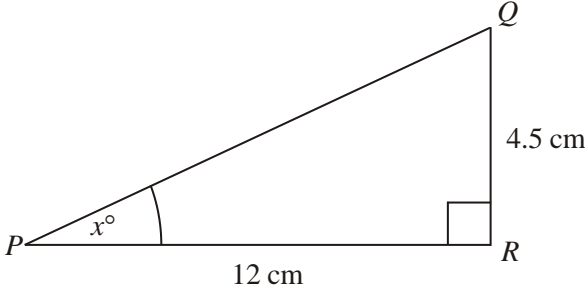
Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

$x = \dots\dots\dots$

(3 marks)

7.

Diagram NOT accurately drawn



$PQR$  is a right-angled triangle.  
 $PR = 12$  cm.  
 $QR = 4.5$  cm.  
Angle  $PRQ = 90^\circ$ .

Work out the value of  $x$ .  
Give your answer correct to one decimal place.

$x = \dots\dots\dots$

(3 marks)

8. Calculate the size of angle  $a$  in this right-angled triangle.  
Give your answer correct to 3 significant figures.

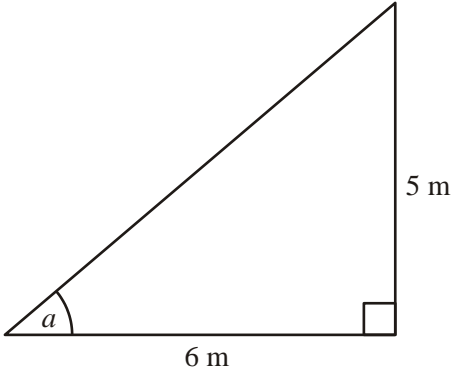


Diagram NOT accurately drawn

$\dots\dots\dots$

(3 marks)

9.  $PQR$  is a right-angled triangle.

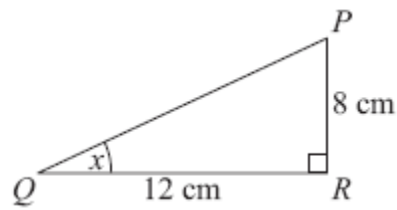


Diagram **NOT** accurately drawn

$PR = 8\text{ cm}$ .  
 $QR = 12\text{ cm}$ .

- (a) Find the size of the angle marked  $x$ .  
 Give your answer correct to 1 decimal place.

.....<sup>o</sup>  
**(3)**

$XYZ$  is a different right-angled triangle.

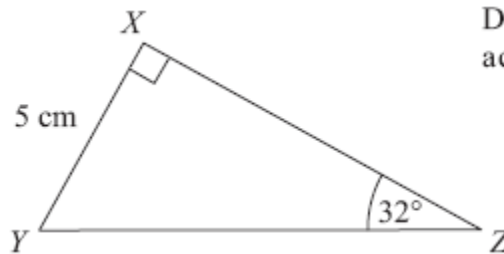


Diagram **NOT** accurately drawn

$XY = 5\text{ cm}$ .  
 Angle  $Z = 32^\circ$ .

- (b) Calculate the length  $YZ$ .  
 Give your answer correct to 3 significant figures.

..... cm  
**(3)**

**(6 marks)**

10. The diagram shows a quadrilateral  $ABCD$ .

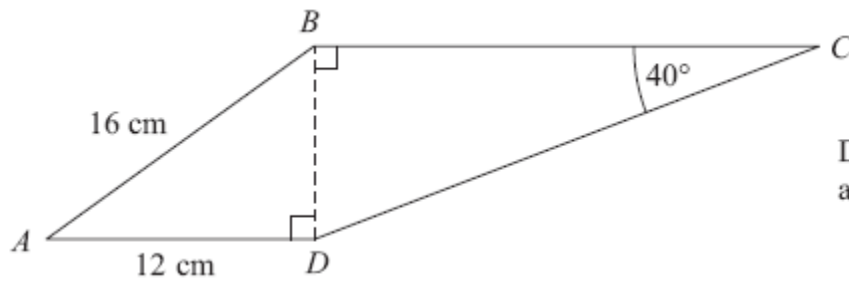


Diagram **NOT**  
accurately drawn

$AB = 16\text{ cm}$ .

$AD = 12\text{ cm}$ .

Angle  $BCD = 40^\circ$ .

Angle  $ADB = \text{angle } CBD = 90^\circ$ .

Calculate the length of  $CD$ .

Give your answer correct to 3 significant figures.

..... cm

**(5 marks)**

11.

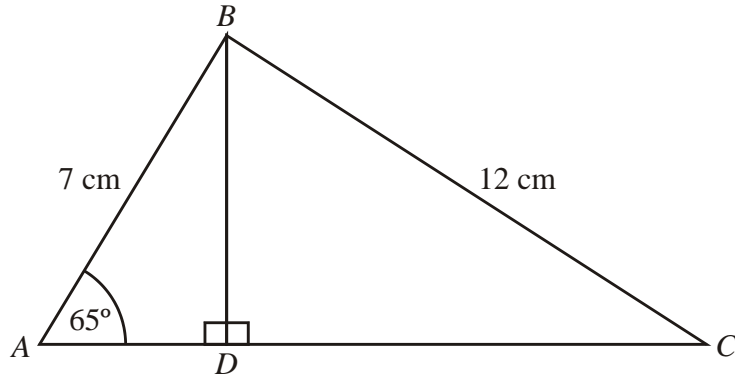


Diagram **NOT**  
accurately drawn

$ABC$  is a triangle.

$ADC$  is a straight line with  $BD$  perpendicular to  $AC$ .

$AB = 7$  cm.

$BC = 12$  cm.

Angle  $BAD = 65^\circ$ .

Calculate the length of  $AC$ .

Give your answer correct to 3 significant figures.

..... cm

**(6 marks)**

# 90 Edexcel GCSE

## Mathematics (Linear) – 1MA0

# CIRCLE THEOREMS

### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Nil



### 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.

### Information

---

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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

### 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.

1.

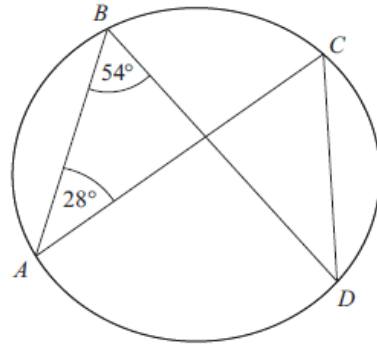


Diagram NOT accurately drawn

$A, B, C$  and  $D$  are points on the circumference of a circle.  
 Angle  $ABD = 54^\circ$ .  
 Angle  $BAC = 28^\circ$ .

(i) Find the size of angle  $ACD$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
 .....

**(3 marks)**

2.

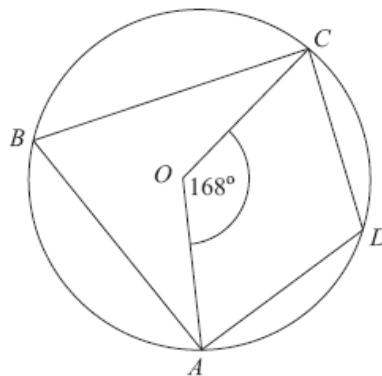


Diagram NOT accurately drawn

$A, B, C$  and  $D$  are points on the circumference of a circle, centre  $O$ .

Angle  $AOC = 168^\circ$

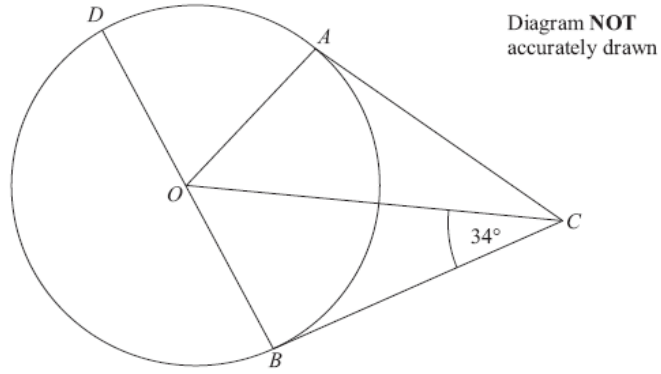
Work out the size of angle  $ADC$ .  
 You must give reasons for your working.

.....<sup>o</sup>

**(4 marks)**



3.



$A$ ,  $B$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $BOD$  is a diameter of the circle.  
 $BC$  and  $AC$  are tangents to the circle.  
 Angle  $OCB = 34^\circ$ .

Work out the size of angle  $DOA$ .

.....<sup>o</sup>

**(4 marks)**

4.

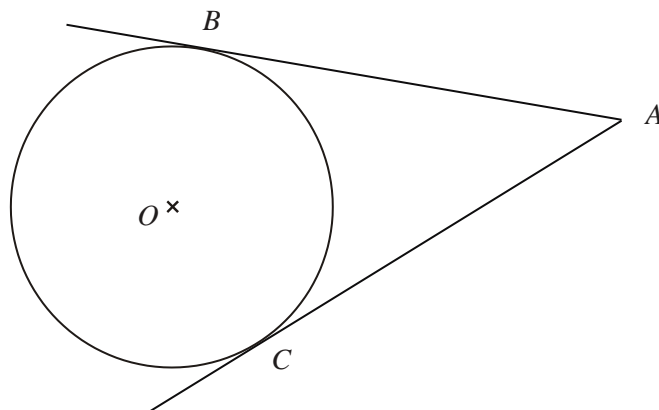


Diagram **NOT** accurately drawn

$B$  and  $C$  are points on a circle, centre  $O$ .  
 $AB$  and  $AC$  are tangents to the circle.  
 Angle  $BOC = 130^\circ$ .

Work out the size of angle  $BAO$ .

.....<sup>o</sup>

**(4 marks)**

5.

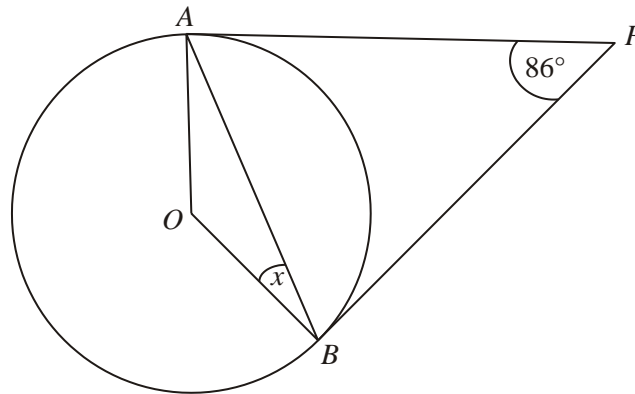


Diagram **NOT** accurately drawn

*A* and *B* are points on the circumference of a circle, centre *O*.  
*PA* and *PB* are tangents to the circle.  
Angle *APB* is  $86^\circ$ .

Work out the size of the angle marked *x*.

.....<sup>o</sup>

**(3 marks)**

6.

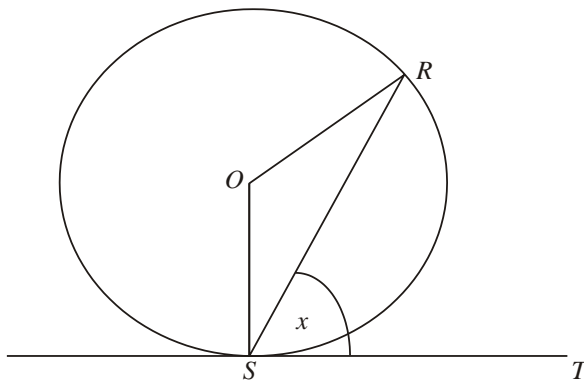


Diagram **NOT** accurately drawn

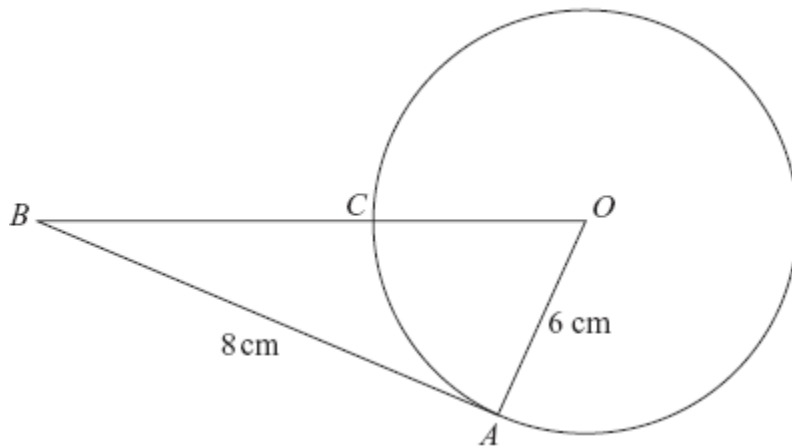
*R* and *S* are two points on a circle, centre *O*.  
*TS* is a tangent to the circle.  
Angle *RST* = *x*.

Prove that angle *ROS* =  $2x$ .  
You must give reasons for each stage of your working.

**(4 marks)**

7.

Diagram NOT  
accurately drawn



In the diagram,  $O$  is the centre of the circle.  
 $A$  and  $C$  are points on the circumference of the circle.  
 $BCO$  is a straight line.  
 $BA$  is a tangent to the circle.

$AB = 8$  cm.  
 $OA = 6$  cm.

(a) Explain why angle  $OAB$  is a right angle.

.....  
.....

(1)

(b) Work out the length of  $BC$ .

.....cm  
(3)

**(4 marks)**

8.

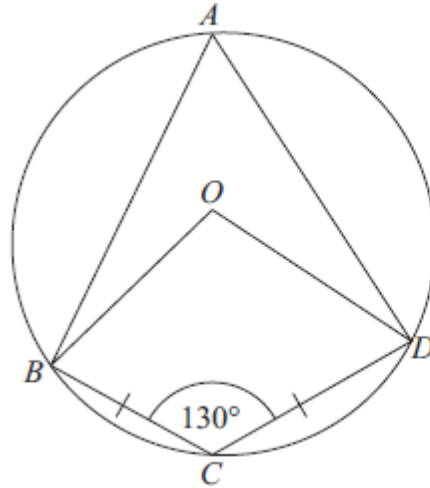


Diagram NOT  
accurately drawn

$A, B, C$  and  $D$  are points on a circle, centre  $O$ .  
 $BC = CD$ .  
Angle  $BCD = 130^\circ$ .

- (a) Write down the size of angle  $BAD$ .  
Give a reason for your answer.

.....<sup>o</sup>  
(2)

- (b) Work out the size of angle  $ODC$ .  
Give reasons for your answer.

.....<sup>o</sup>  
(4)

**(6 marks)**

9.

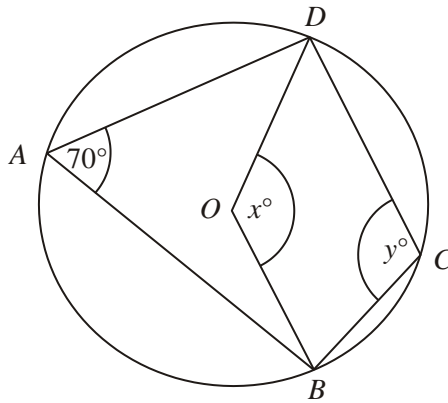


Diagram **NOT** accurately drawn

In the diagram,  $A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
Angle  $BAD = 70^\circ$ .  
Angle  $BOD = x^\circ$ .  
Angle  $BCD = y^\circ$ .

(a) (i) Work out the value of  $x$ .

$x = \dots\dots\dots$

(ii) Give a reason for your answer.

.....  
.....

(2)

(b) (i) Work out the value of  $y$ .

$y = \dots\dots\dots$

(ii) Give a reason for your answer.

.....  
.....

(2)

**(4 marks)**

10.

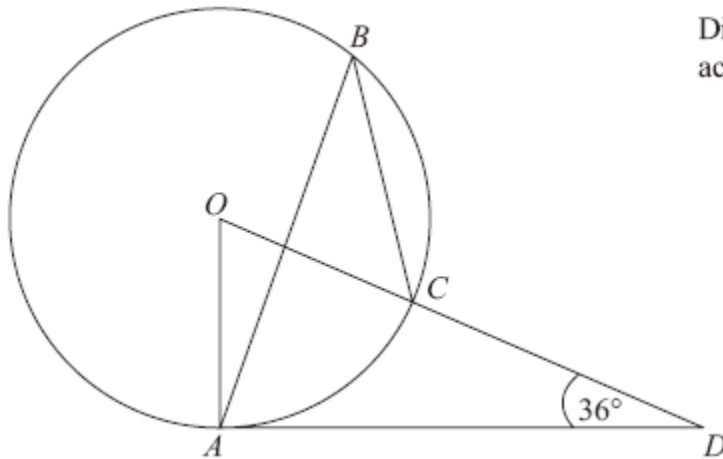


Diagram **NOT** accurately drawn

The diagram shows a circle centre  $O$ .  
 $A$ ,  $B$  and  $C$  are points on the circumference.

$DCO$  is a straight line.  
 $DA$  is a tangent to the circle.

Angle  $ADO = 36^\circ$

(a) Work out the size of angle  $AOD$ .

.....<sup>o</sup>  
**(2)**

(b) (i) Work out the size of angle  $ABC$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
 .....  
 .....

**(3)**  
**(4 marks)**

11.

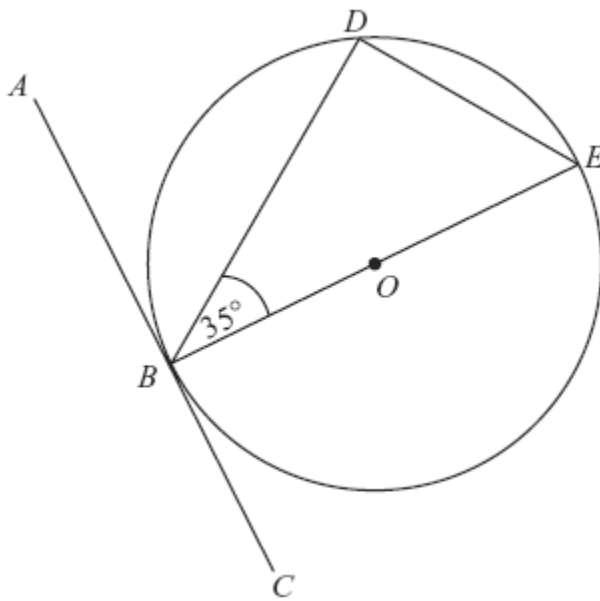


Diagram NOT  
accurately drawn

$B$ ,  $D$  and  $E$  are points on a circle centre  $O$ .  
 $ABC$  is a tangent to the circle.  
 $BE$  is a diameter of the circle.  
Angle  $DBE = 35^\circ$ .

(a) Find the size of angle  $ABD$ .

Give a reason for your answer.

.....<sup>o</sup>  
(2)

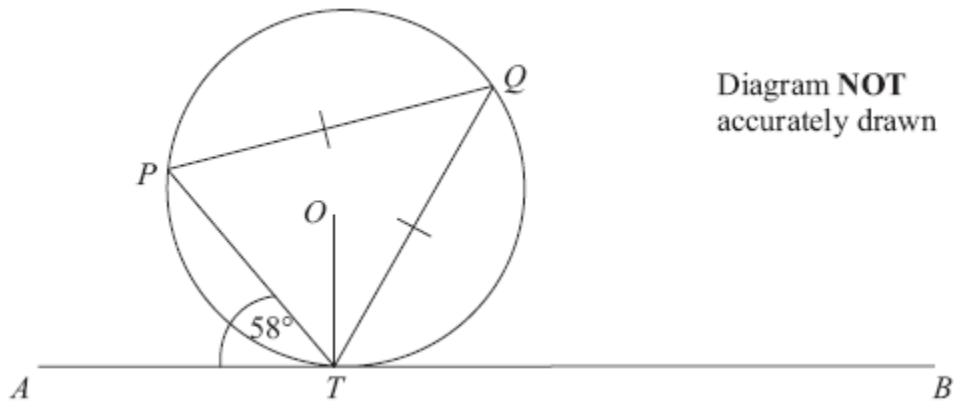
(b) Find the size of angle  $DEB$ .

Give a reason for your answer.

.....<sup>o</sup>  
(2)

**(4 marks)**

12.



$P$ ,  $Q$  and  $T$  are points on the circumference of a circle, centre  $O$ .  
The line  $ATB$  is the tangent at  $T$  to the circle.

$PQ = TQ$ .  
Angle  $ATP = 58^\circ$ .

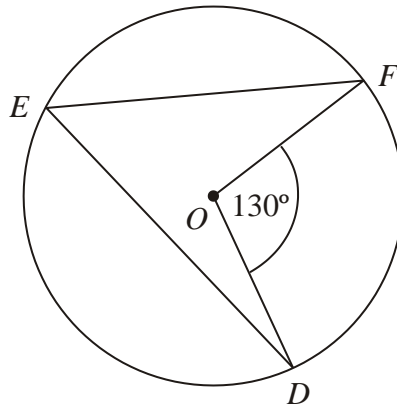
Calculate the size of angle  $OTQ$ .  
Give a reason for each stage in your working.

..... °

**(4 marks)**



13. (a)



$D$ ,  $E$  and  $F$  are points on the circumference of a circle, centre  $O$ .  
Angle  $DOF = 130^\circ$ .

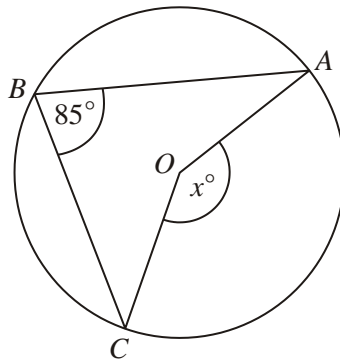
(i) Work out the size of angle  $DEF$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
.....

(2)



(b)

In the diagram,  $A$ ,  $B$  and  $C$  are points on the circumference of a circle, centre  $O$ .  
Angle  $ABC = 85^\circ$ .

(i) Work out the size of the angle marked  $x^\circ$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

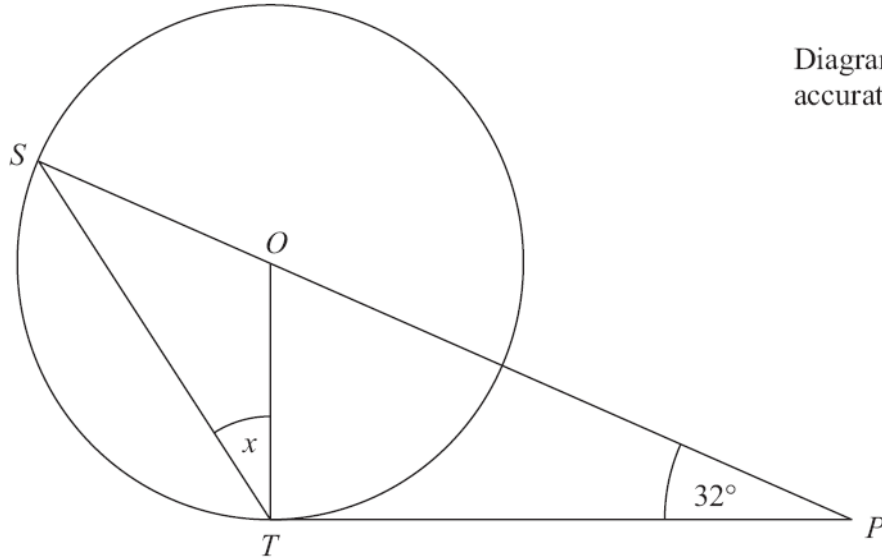
.....  
.....

(2)

(4 marks)

\*14.

Diagram **NOT**  
accurately drawn



$S$  and  $T$  are points on the circumference of a circle, centre  $O$ .  
 $PT$  is a tangent to the circle.  
 $SOP$  is a straight line.

Angle  $OPT = 32^\circ$ .

Work out the size of the angle marked  $x$ .  
Give reasons for your answer.

.....<sup>o</sup>

**(Total 5 marks)**