

# GCSE Mathematics

## Practice Tests: Set 3

### Paper 1H (Non-calculator)

Time: 1 hour 30 minutes

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

#### 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 not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**



#### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

#### 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.

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

1. The equation of a straight line is  $y = 4x + 7$

(a) Write down the gradient of the line.

.....  
**(1)**

(b) Write down the  $y$ -intercept of the line.

.....  
**(1)**

**(Total 2 mark)**

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2. Work out  $3\frac{1}{8} - 1\frac{2}{3}$

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

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3. Here are the ingredients needed to make 8 shortbread biscuits.

Shortbread biscuits  
makes 8 biscuits  
120 g butter  
60 g caster sugar  
180 g flour

Tariq is going to make some shortbread biscuits.  
He has the following ingredients

330 g butter      200 g caster sugar      450 g flour

Work out the greatest number of shortbread biscuits that Tariq can make with his ingredients.  
You must show all your working.

..... biscuits

**(Total 3 marks)**

4. Railtickets and Cheaptrains are two websites selling train tickets.

Each of the websites adds a credit card charge and a booking fee to the ticket price.

**Railtickets**

Credit card charge: 2.25% of ticket price

Booking fee: 80 pence

**Cheaptrains**

Credit card charge: 1.5% of ticket price

Booking fee: £1.90

Nadia wants to buy a train ticket.  
The ticket price is £60 on each website.  
Nadia will pay by credit card.

Will it be cheaper for Nadia to buy the train ticket from Railtickets or from Cheaptrains?

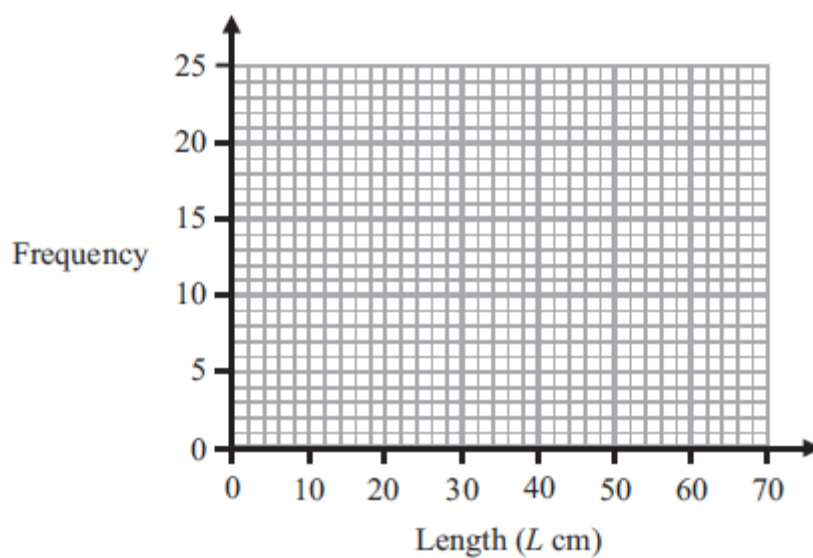
**(Total 4 marks)**

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5. The table gives information about the lengths of the branches on a bush.

Length( $L$ cm)	Frequency
$0 \leq L < 10$	20
$10 \leq L < 20$	12
$20 \leq L < 30$	10
$30 \leq L < 40$	8
$40 \leq L < 50$	6
$50 \leq L < 60$	0

(a) Draw a frequency polygon to show this information.



(2)

(b) Work out the total number of branches on the bush.

.....

(2)

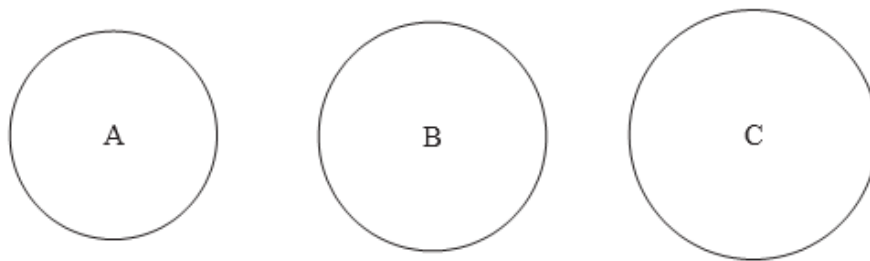
(c) Write down the modal class interval.

.....

(1)

**(Total 5 marks)**

6. Here are three circles A, B and C.



Diagrams **NOT**  
accurately drawn

The area of circle A is  $200 \text{ cm}^2$ .

The area of circle B is 10% larger than the area of circle A.

The area of circle C is 10% larger than the area of circle B.

How much larger is the area of circle C than the area of circle A?

**(Total 4 marks)**

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

.....  
(2)

(b) Factorise completely  $8p - 12pq$

.....  
(2)

**(Total 4 marks)**

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8. The diagram shows a triangle.

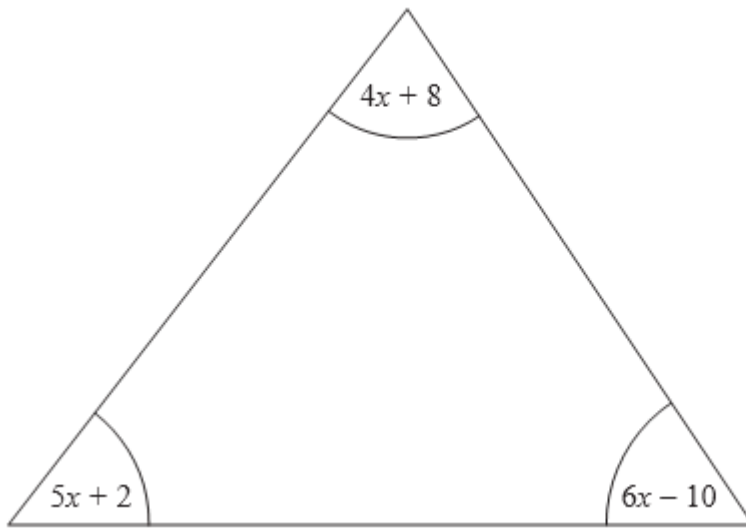


Diagram **NOT**  
accurately drawn

All the angles are measured in degrees.

Show that the triangle is isosceles.

**(Total 5 marks)**

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9. (a) Find the Highest Common Factor (HCF) of 30 and 42.

.....  
(2)

(b) Find the Lowest Common Multiple (LCM) of 30 and 45.

.....  
(2)

**(Total 4 marks)**

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10.

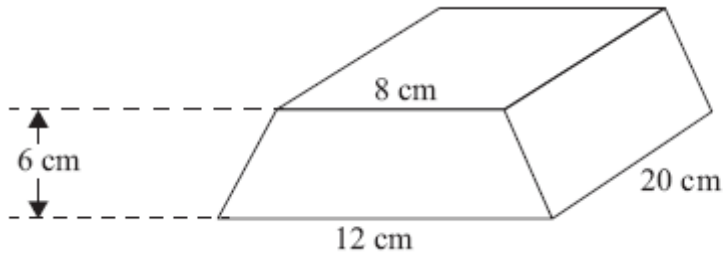


Diagram NOT accurately drawn

The diagram shows a solid prism made from metal.  
The cross-section of the prism is a trapezium.

The parallel sides of the trapezium are 8 cm and 12 cm.  
The height of the trapezium is 6 cm.  
The length of the prism is 20 cm.

The density of the metal is 5 g/cm<sup>3</sup>.

Calculate the mass of the prism.  
Give your answer in kilograms.

..... kg  
**(Total 5 marks)**

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11. (a) Write down the value of  $25^0$

.....  
**(1)**

(b) Write down the value of  $49^{-\frac{1}{2}}$

.....  
**(1)**

(c) Write as a power of 2  $\frac{4 \times 8}{16^3}$

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

**(Total 5 marks)**

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12. There are 9 counters in a box.

4 of the counters are red.

2 of the counters are blue.

3 of the counters are yellow.

Pavinder takes at random two counters from the box.

Work out the probability that he takes at least one yellow counter.

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

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13. Simplify fully  $\frac{2x^2 - 7x + 3}{x^2 - 9}$

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

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14. Work out  $(2 + \sqrt{3})(2 - \sqrt{3})$   
Give your answer in its simplest form.

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

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15.

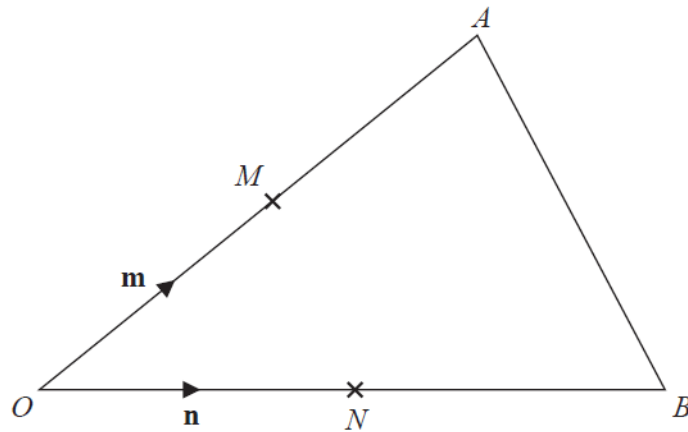


Diagram **NOT**  
accurately drawn

$OAB$  is a triangle.

$M$  is the midpoint of  $OA$ .

$N$  is the midpoint of  $OB$ .

$$\overrightarrow{OM} = \mathbf{m}$$

$$\overrightarrow{ON} = \mathbf{n}$$

Show that  $AB$  is parallel to  $MN$ .

**(Total 3 marks)**

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16.

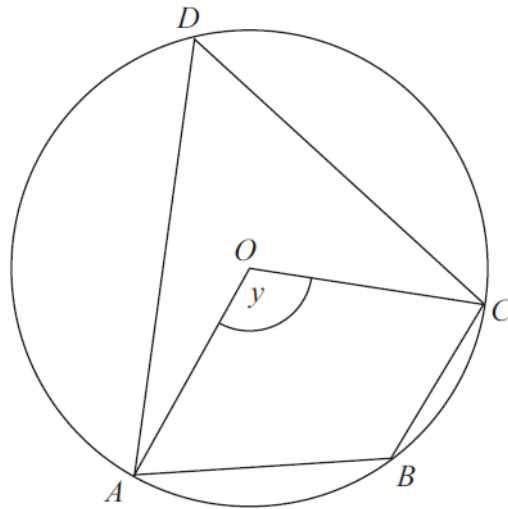


Diagram **NOT**  
accurately drawn

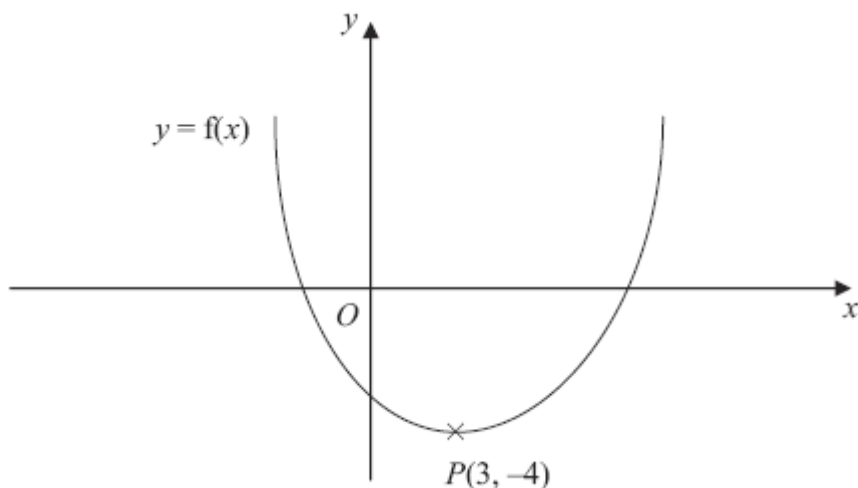
$A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .

Angle  $AOC = y$ .

Find the size of angle  $ABC$  in terms of  $y$ .  
Give a reason for each stage of your working.

**(Total 4 marks)**

17. This is a sketch of the curve with the equation  $y = f(x)$ .  
The only minimum point of the curve is at  $P(3, -4)$ .



- (a) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x - 2)$ .

(..... , .....)

**(2)**

- (b) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x + 5) + 6$

(..... , .....)

**(2)**

**(Total 4 marks)**

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18.

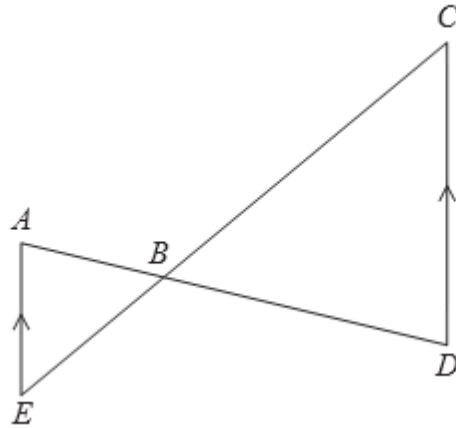


Diagram **NOT**  
accurately drawn

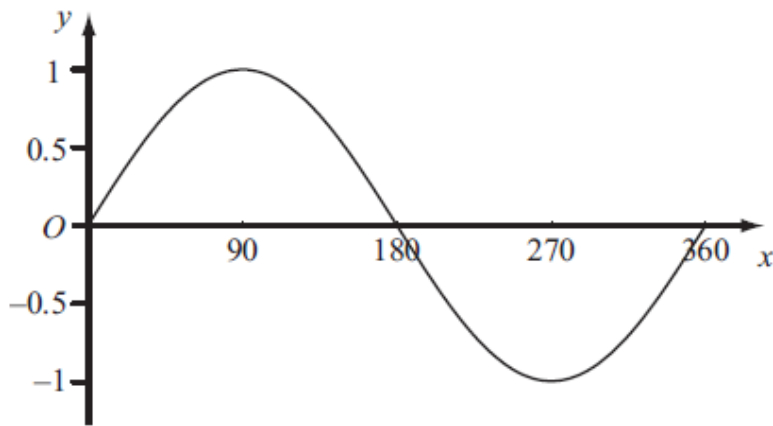
$AE$  is parallel to  $CD$ .  
 $ABD$  and  $EBC$  are straight lines.

Prove that triangle  $ABE$  is similar to triangle  $DBC$ .  
Give reasons for each stage of your proof.

**(Total 4 marks)**

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19. The diagram shows a sketch of the curve  $y = \sin x^\circ$  for  $0 \leq x \leq 360$



The exact value of  $\sin 60^\circ = \frac{\sqrt{3}}{2}$

(a) Write down the exact value of

(i)  $\sin 120^\circ$ ,

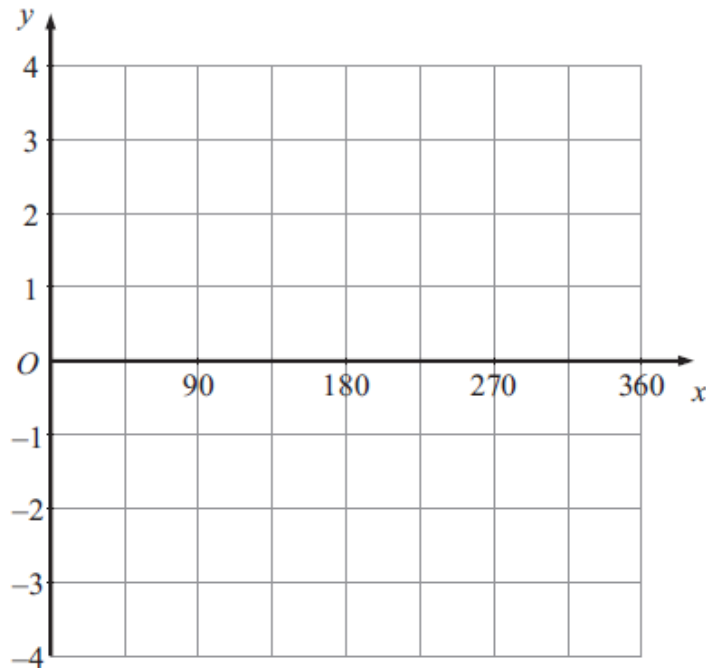
.....

(ii)  $\sin 240^\circ$ .

.....

(2)

(b) On the grid below, sketch the graph of  $y = \sin (x + 45)^\circ$  for  $0 \leq x \leq 360$ .



(2)

(Total 4 marks)

20. Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

**(Total 4 marks)**

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- 21 Sketch the graph of  $f(x) = -x^2 - 3x + 5$ , showing the coordinates of the turning point and the coordinates of any intercepts with the coordinate axes.

**(Total 4 mark)**

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**TOTAL FOR PAPER IS 80 MARKS**