Name: ………………………………………….   **Video Solutions:**

MATHS FOR GRANTED
EASTER GCSE MOCK EXAMINATIONS 2023

PAPER 3 (Calculator)
Higher Tier
Time: 1 hour 30 minutes

You must have: Ruler, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

Instructions

Use **black** ink or ball-point pen.

Fill in your name at the top of this page.

Answer **all** questions.

Answer the questions in the spaces provided.

Calculators MAY 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.

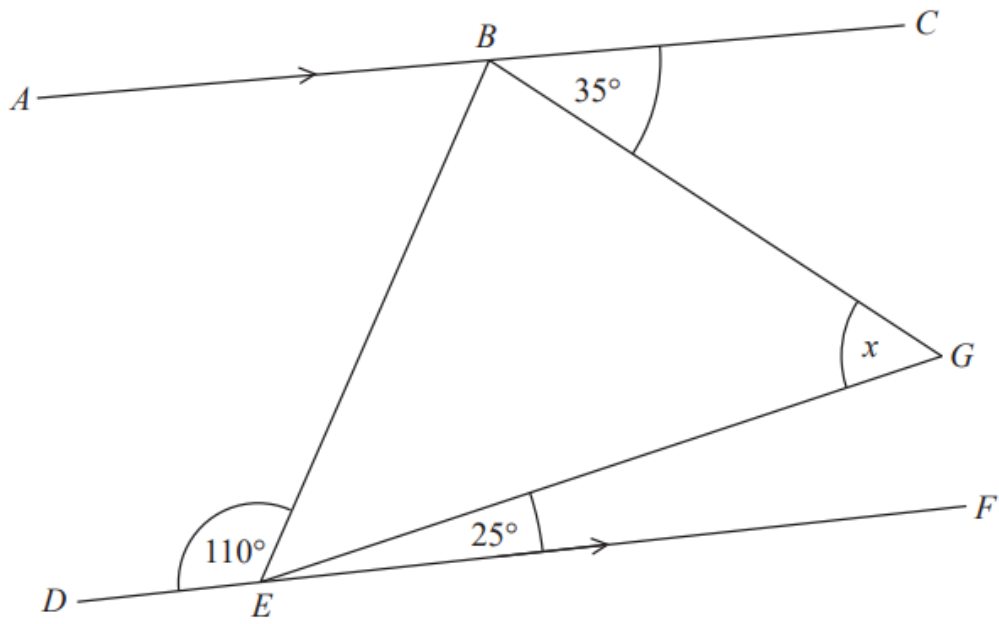The marks for **each** question are shown in brackets.

Advice

Read each question carefully and try to answer every question.

Keep an eye on the time and check your answers, if you have time, at the end.

Q1.

BEG is a triangle.

ABC and *DEF* are parallel lines.

Work out the size of angle *x*.
Give a reason for each stage of your working.

....°

(Total for question = 4marks)

Q2.   A box contains only red, blue and green pens.

The ratio of red pens to blue pens is 5 : 9.

The ratio of blue pens to green pens is 1 : 4.

Calculate the percentage of pens that are blue.

....

(Total for question = 3 marks)

Q3.

| Investment A | Save £150 per month for 2 years. |
| | 2.5% interest is added to the total amount saved. |

| Investment B | Invest £3500 |
| | Compound interest is added at 3% per year. |

After 2 years, how much **more** is investment B worth than investment A?

....
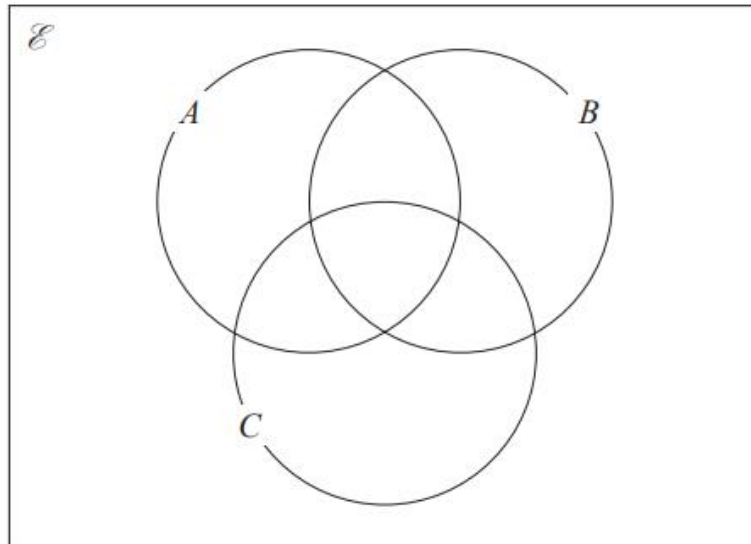
(Total for question = 4 marks)

Q4.

$\mathscr{E} = $ {even numbers between 1 and 25}
$A = $ {2, 8, 10, 14}
$B = $ {6, 8, 20}
$C = $ {8, 18, 20, 22}

(a) Complete the Venn diagram for this information.

(3)

A number is chosen at random from $\mathscr{E}$.

(b) Find the probability that the number is a member of $A \cap B$.

....

(2)

(Total for question = 5 marks)

Q5.

Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

Calculate an estimate for the mean waist size.

....inches

(Total for question = 3 marks)

Q6.

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

....

(2)

(b) Factorise $x^2 + 4x + 3$

....

(2)

(Total for question = 4 marks)

Q7.

ABCDE is a pentagon.
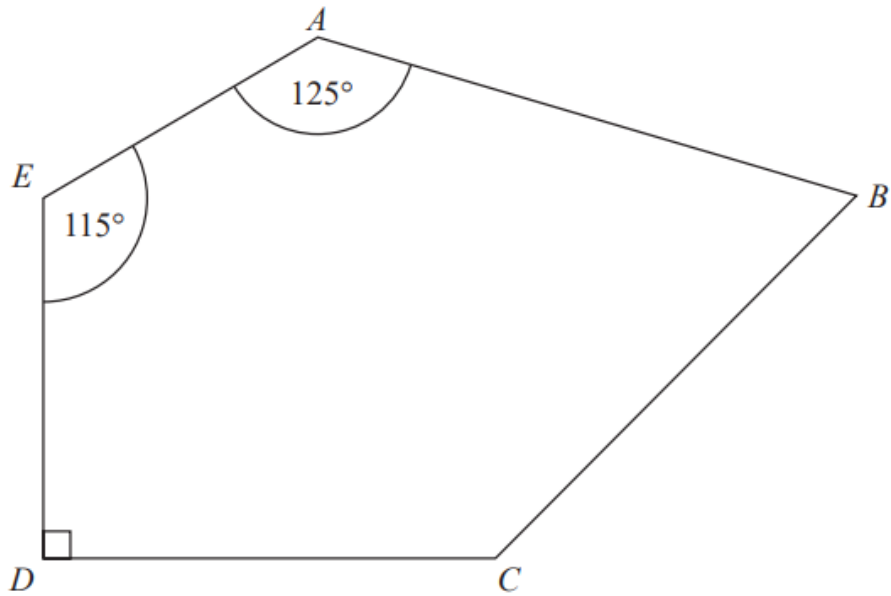
Angle *BCD* = 2 × angle *ABC*

Work out the size of angle *BCD*.
You must show all your working.

.....................................°

(Total for question = 4 marks)

Q8.

(a) Complete this table of values for $y = x^2 + x - 4$

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

(2)

(b) On the grid, draw the graph of $y = x^2 + x - 4$ for values of x from -3 to 3
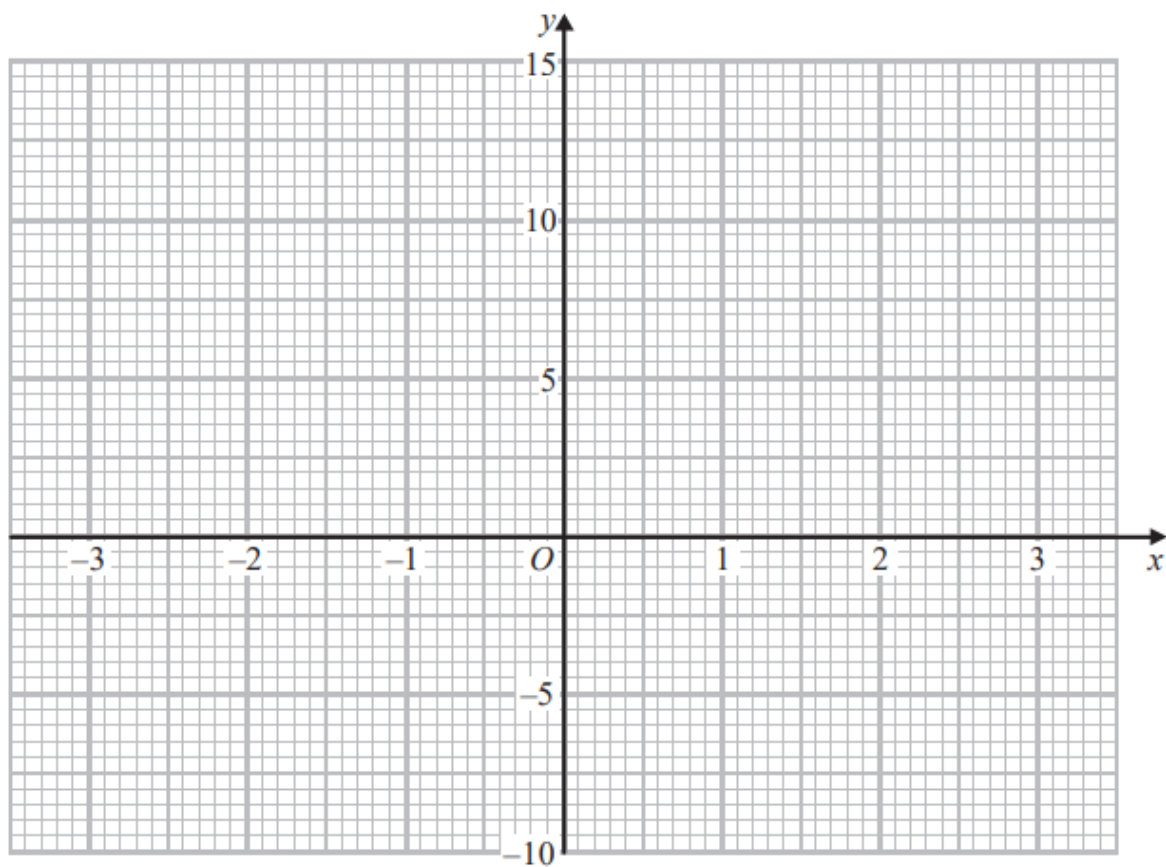
(2)

(c) Use the graph to estimate a solution to $x^2 + x - 4 = 0$

(1)

(Total for question = 5 marks)

Q9.

The equation of line *A* is $y = 5 - 2x$
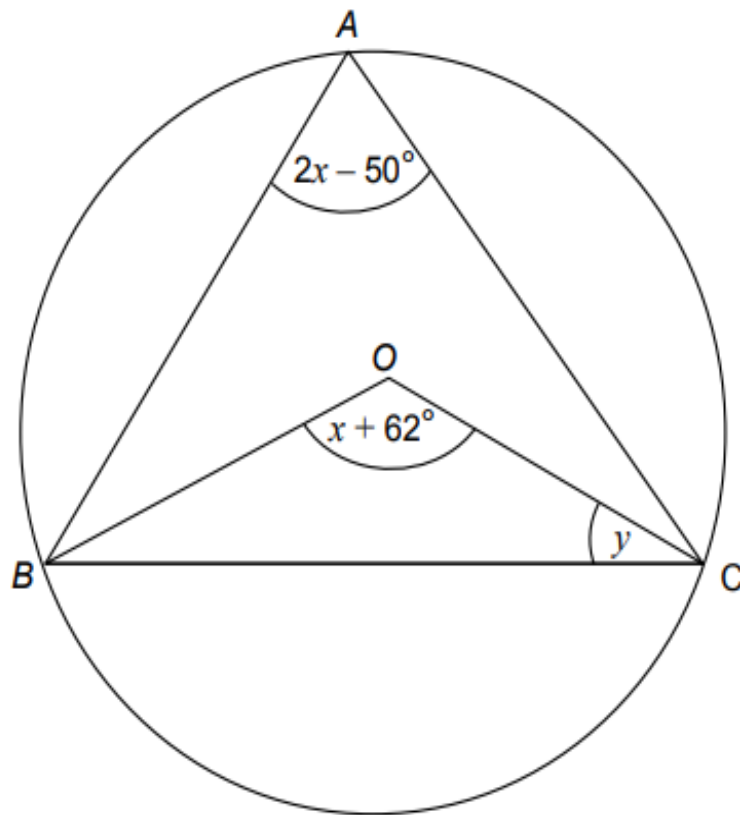
Line *B* is parallel to line *A*.

Line *B* passes through the point $(-3, 7)$.

Work out the coordinates of the point where line *B* intersects the *x*-axis.

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

(Total for question = 4 marks)

Q10.

A, B and C are points on a circle, centre O.

Not drawn accurately

Work out the size of angle y.

....

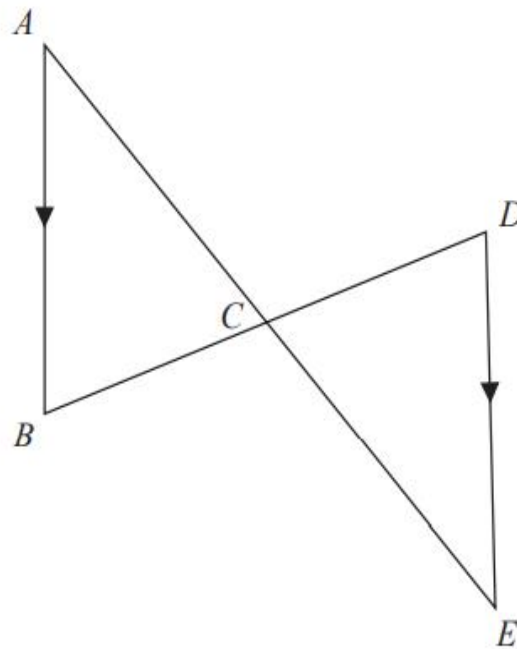**(Total for question = 4 marks)**

Q11.

Diagram **NOT** accurately drawn

In the diagram *ACE* and *BCD* are straight lines such that the point *C* is the midpoint of *BD*.

AB is parallel to *DE*.

Prove that the triangles *ABC* and *EDC* are congruent.

(Total for question = 4 marks)

Q12.

$$f(x) = 3x^2 + 6 \qquad \text{for all } x$$

$$g(x) = \sqrt{x-5} \qquad x \geqslant 5$$

(a) Work out the value of $gf(4)$

....

(2)

(b) Show that $fg(x)$ can be written in the form $a(x-a)$ where a is an integer.

....
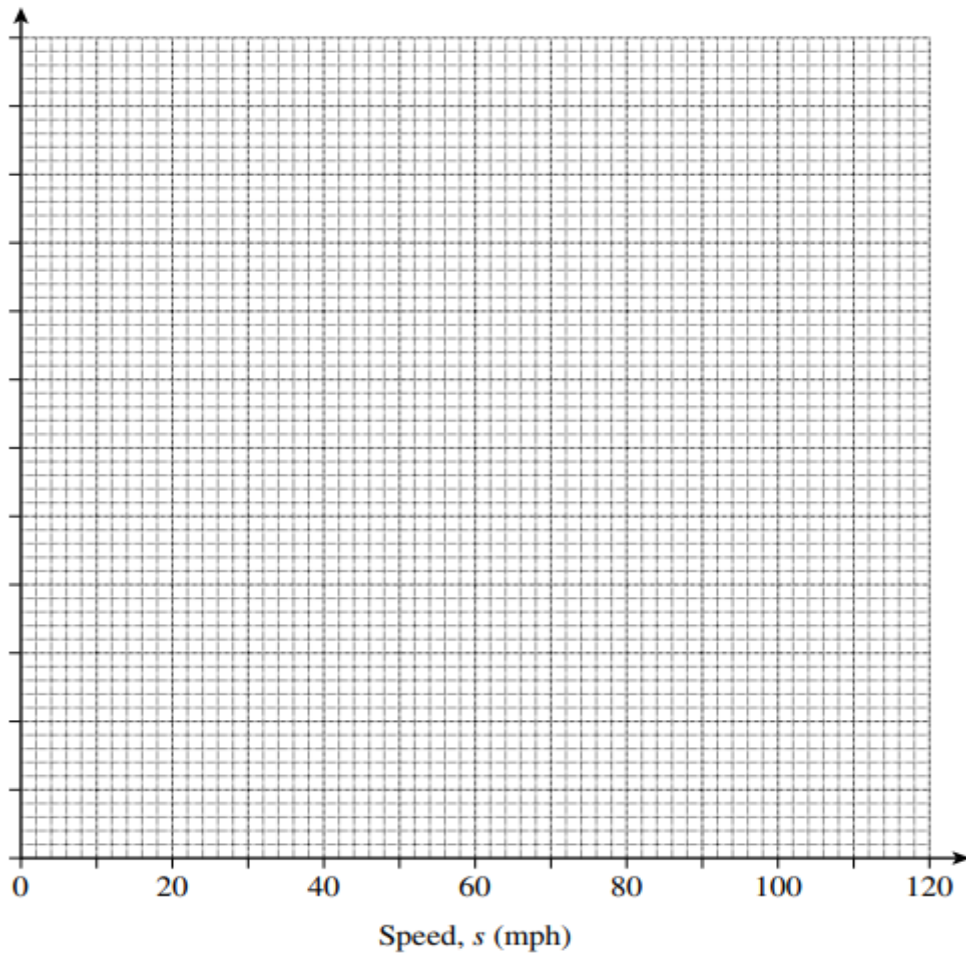
(2)

(Total for question = 4 marks)

Q13.

A mobile speed camera recorded the speed of some vehicles on a motorway.
The table shows the results.

Speed, s (mph)	Frequency
$0 < s \leqslant 30$	42
$30 < s \leqslant 50$	54
$50 < s \leqslant 60$	82
$60 < s \leqslant 70$	116
$70 < s \leqslant 80$	70
$80 < s \leqslant 120$	36
Total	400

(a) Draw a histogram to illustrate the data.

Speed, s (mph)

(3)

(b) Drivers of vehicles doing more than 77 miles per hour were given a speeding ticket.

Estimate the number of drivers who receive a ticket.

....

(1)

(Total for question = 4 marks)

Q14. The ratio of the number of boys to girls in a school is 2:3.

After 120 boys leave and 100 girls leave, the ratio becomes 4:7.

Find the original number of girls in the school.

....

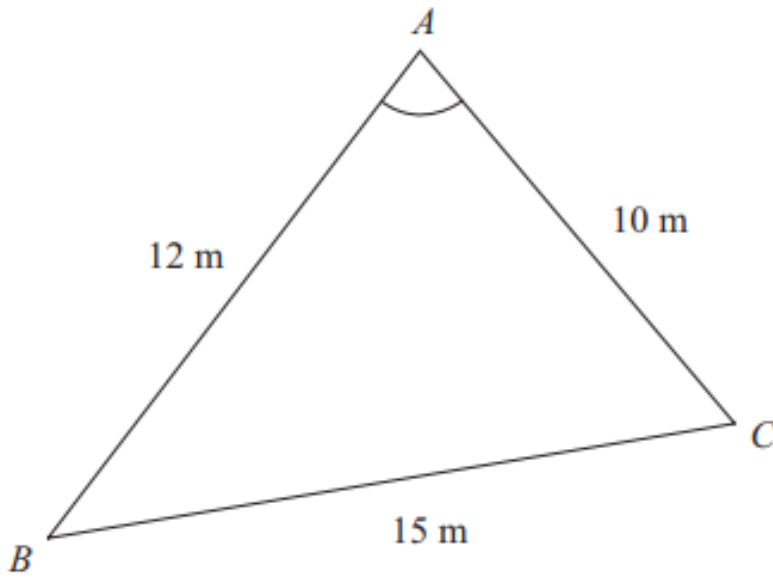**(Total for question = 3 marks)**

Q15.

Diagram **NOT** accurately drawn

ABC is a triangle.
AB = 12 m.
AC = 10 m.
BC = 15 m.

Calculate the size of angle *BAC*.
Give your answer correct to one decimal place.

....°

(Total for question = 3 marks)

Q16.

(a) Show that the equation

$$\frac{5}{x+2} = \frac{4-3x}{x-1}$$

can be rearranged to give $3x^2 + 7x - 13 = 0$

(3)

(b) Solve $3x^2 + 7x - 13 = 0$
Give your solutions correct to 2 decimal places.

x = ..., or x = ...

(2)

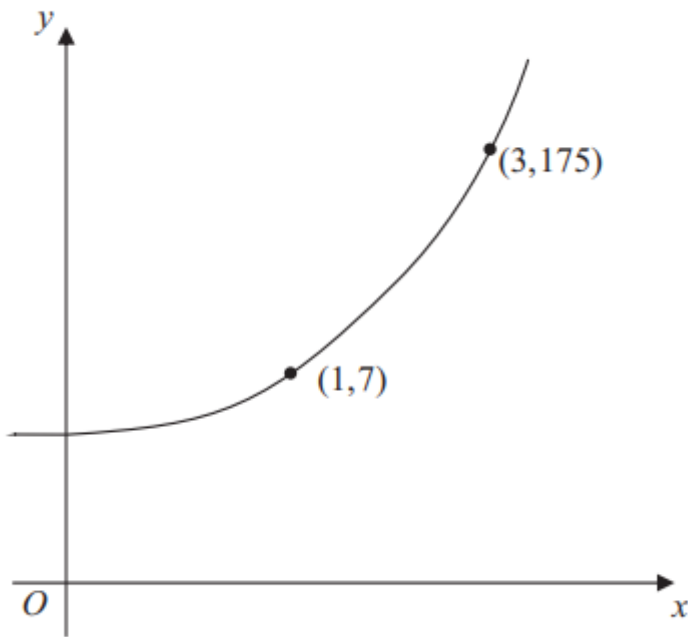**(Total for question = 5 marks)**

Q17

Diagram **NOT** accurately drawn

The sketch shows a curve with equation

$$y = ka^x$$

where k and a are constants, and $a > 0$

The curve passes through the points $(1, 7)$ and $(3, 175)$.

Calculate the value of k and the value of a.

k = ...

a = ...

(Total for question = 3 marks)

Q18.

(a)

Factorise fully $15x^3y - 20x^2y^2$

....
(2)

(b)

Simplify fully $\dfrac{(27x^6)^{\frac{2}{3}}}{18x^3}$

....
(3)
(Total for question = 5 marks)
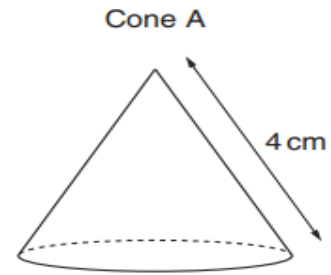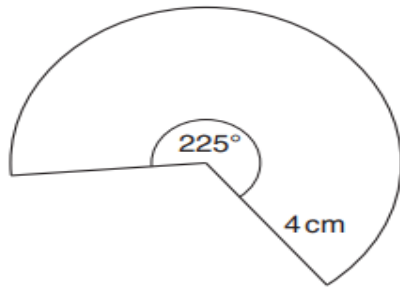
Q19.

Prove that

$(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8

for all positive integer values of n.

(Total for question = 3 marks)

Q20.

The diagram shows the net of cone A.

NOT TO
SCALE

225°

4 cm

Cone A

4 cm

(a) (i) Show that the radius of the base of cone A is 2.5 cm.

(2)

(ii) Calculate the volume of cone A.

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

h

r

....cm³

(3)

(b) Cone B is made from a mathematically similar net.
This net is an enlargement of the original net, with length scale factor 3.

Complete the following.

Volume of cone A : Volume of cone B = 1 : ………………..

(1)

(Total for question = 6 marks)

TOTAL FOR PAPER IS 80 MARKS