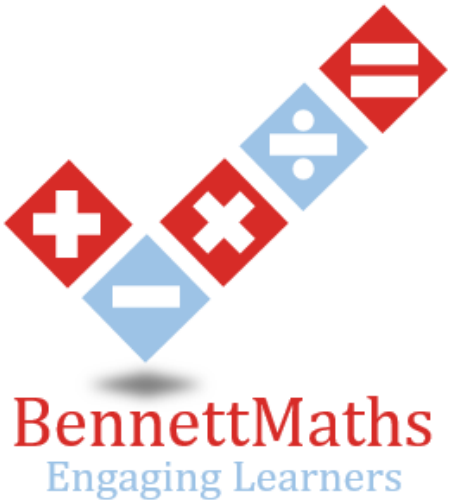
BennettMaths will be live on TikTok the night before paper 1, going through all the predicted papers.
Wednesday 13th May at 8pm

Candidate surname	Other names



AQA

Best Guess Paper – 1H Non-Calculator

Within this booklet you will find my best guess at which topics might be on the first AQA Higher gcse maths paper.

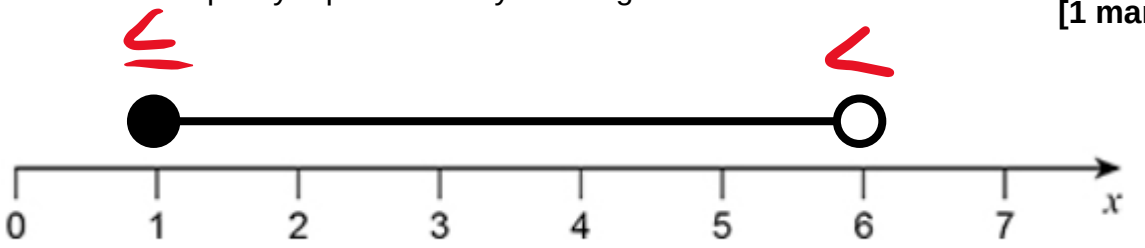
There may be other topics that appear on paper 1, so please ensure that you continue to revise all topics.

The paper consists of 23 questions totalling 80 marks.

1

(a) Circle the inequality represented by the diagram.

[1 mark]



$1 < x < 6$ $1 \leq x < 6$ $1 \leq x \leq 6$ $1 < x \leq 6$

(b) Circle the list of **all** the integers that satisfy $-1 < x \leq 5$

[1 mark]

$-1,0,1,2,3,4,5$ $-1,0,1,2,3,4$

$0,1,2,3,4$ $0,1,2,3,4,5$

5^2

2 Express $5^4 \div 5^{-2} \times 25$ in the form 5^n

$5^6 \times 5^2 = 5^8$

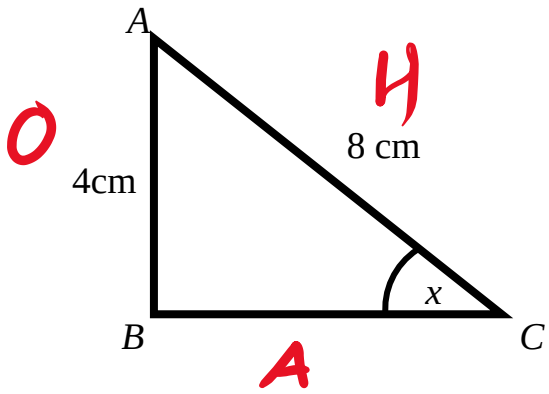
[2 marks]

Answer 5^8

3

Triangle ABC is shown below.

AB = 4cm
AC = 8cm



O H A

Work out the size of angle x

[3 marks]

$\sin(x) = \frac{4}{8} = \frac{1}{2}$

Answer $x = 30$

4 A number, n, is rounded to 2 significant figures.
The result is 26.
Complete the error interval for n

[2 marks]

$25.5 \leq n < 26.5$

5 ABCD is a rectangle.

$3\frac{3}{4}\ cm = 3\frac{6}{8} = \frac{15}{4}$

$\frac{11}{8} = 1\frac{3}{8}\ cm$

(a) Work out the perimeter of ABCD

[3 marks]

$\left(1\frac{3}{8} + 3\frac{2}{8}\right) \times 2$

$5\frac{1}{8} \times 2$

Answer $10\frac{2}{8}$

(b) Work out the area of ABCD

[2 marks]

$\frac{11}{8} \times \frac{15}{4} = \frac{165}{32}$

Answer

6 Margot takes part in a 5 km fun run.

During the first 3 km she runs at an average speed of 6 km/h.

She is aiming to complete the race in under 54 minutes.

Work out the average speed that she needs to maintain to finish in under 54 minutes.

[4 marks]

$\frac{3}{6} = 0.5 \text{ hours} = 30 \text{ mins}$

$54 - 30 = 24 \text{ mins}$

$5 - 3 = 2 \text{km}$

$2 \text{km} : 24 \text{ mins}$

$1 \text{km} : 12 \text{ mins}$

$5 \text{km} : 60 \text{ mins}$

Answer 5 km/h

7

Here is some information about 120 people who visit a shop.

$\frac{3}{4}$ of the people buy neither a coat nor a dress. 90

19 people buy a coat.

14 people buy a dress.

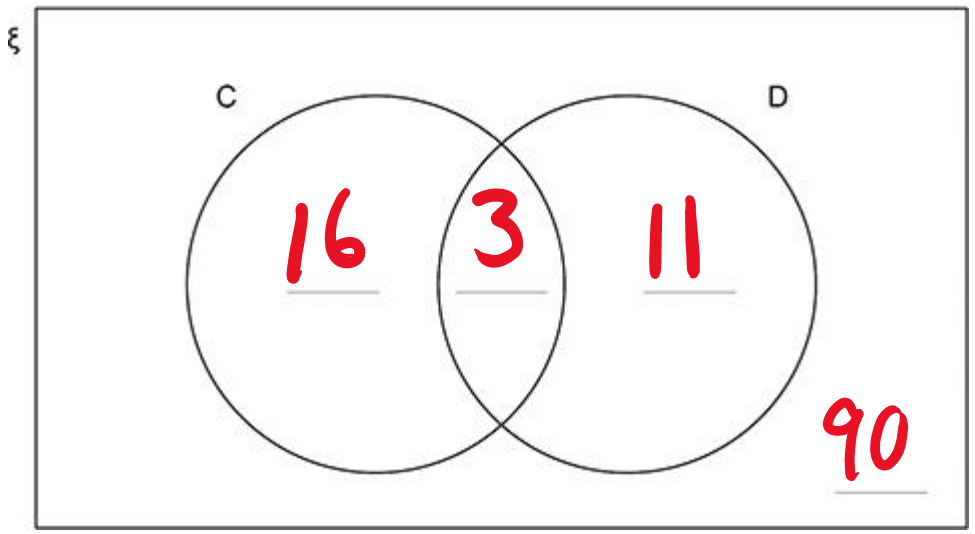
Complete this Venn diagram to represent the information.

ξ = 120 people who visit the shop

C = people who buy a coat

D = people who buy a dress

[3 marks]



120 - 90 = 30

19 + 14 = 33

33 - 30 = 3

8 Circle the factorised version of $x^2 - 5x + 6$

$(x + 3)(x + 2)$ $(x + 3)(x - 2)$

$(x - 3)(x + 2)$ $(x - 3)(x - 2)$

[1 mark]

9 Work out the value of

$$\left(\frac{16}{81}\right)^{-\frac{3}{4}}$$

[3 marks]

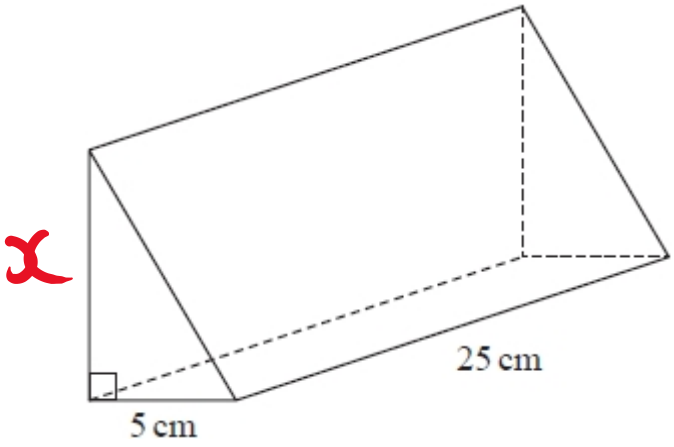
$\left(\frac{81}{64}\right)^{\frac{3}{4}}$

$\sqrt[4]{\frac{81}{64}} = \frac{3}{2}$

$\left(\frac{3}{2}\right)^3 = \frac{27}{8}$

Answer _____

10 The diagram shows a prism.



The cross section of the prism is a right-angled triangle.

The base of the triangle has length 5 cm

The prism has length 25 cm

The prism has volume 750 cm^3

Work out the height of the prism. **[3 marks]**

$\frac{x \times 5}{2} \times 25 = 750$

$\frac{x \times 5}{2} = 30$

$x \times 5 = 60$

$x = 12$

Answer 12

11 Express $8:\sqrt{16\times10^4}$ in the form $1:n$

[3 marks]

$8:\sqrt{16}\times\sqrt{10^4}$

$8:4\times10^2$

$8:400$

$1:50$

Answer _____

12 The group frequency table gives information on the time taken, in minutes, for 80 students to complete their weekly maths homework.

Time (t minutes)	Frequency
$0 < t \leqslant 20$	5
$20 < t \leqslant 40$	30
$40 < t \leqslant 60$	20
$60 < t \leqslant 80$	15
$80 < t \leqslant 100$	8
$100 < t \leqslant 120$	2

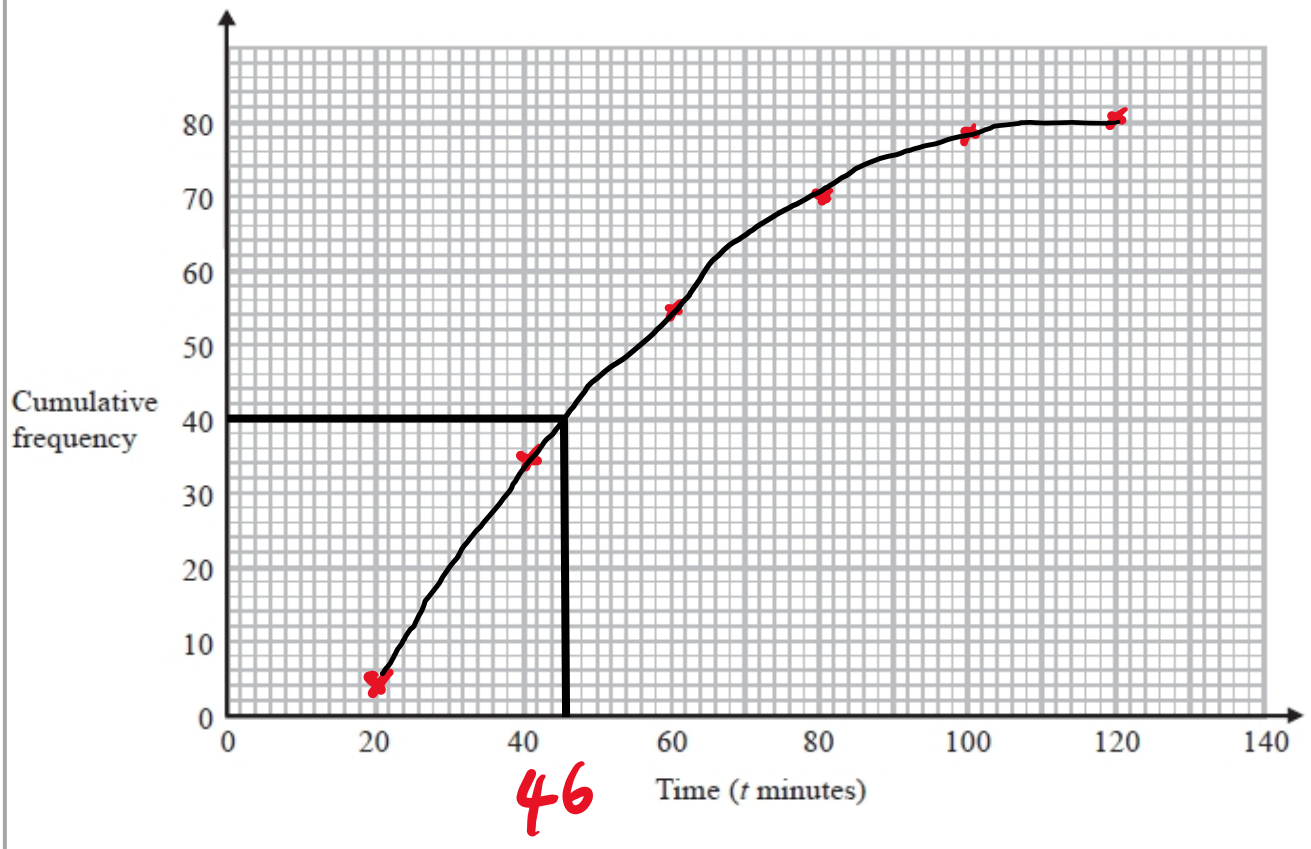
(a) Complete the cumulative frequency table

Time (t minutes)	Cumulative frequency
$0 < t \leqslant 20$	5
$0 < t \leqslant 40$	35
$0 < t \leqslant 60$	55
$0 < t \leqslant 80$	70
$0 < t \leqslant 100$	78
$0 < t \leqslant 120$	80

[1 mark]

(b) On the grid, draw the cumulative frequency graph for this information

[2 marks]



(c) Using your graph, work out an estimate for the median time taken.

[1 mark]

Answer 46

13 Work out

$$0.4\dot{5} \times 0.\dot{7}$$

Give your answer as a fraction. **[4 marks]**
You must show your working

$x = 0.4\dot{5}$
$10x = 4.\dot{5}$
$100x = 45.\dot{5}$
$90x = 41$
$x = \frac{41}{90}$

$x = 0.\dot{7}$
$10x = 7.\dot{7}$
$9x = 7$
$x = \frac{7}{9}$

$\frac{41}{90} \times \frac{7}{9} = \frac{287}{810}$

Answer _____

14 Here are the first four terms of a quadratic sequence.

$$-3, 3, 13, 27$$

Work out an expression, in terms of n, for the nth term of the sequence

[3 marks]

$-3, 3, 13, 27$

$+6 \quad +10 \quad +14$ $\quad 2n^2$

$+4 \quad +4$

$2n^2 = 2, 8, 18, 32$

$-3, 3, 13, 27$

$-5, -5, -5, -5$

Answer $2n^2 - 5$

15 y is directly proportional to x^3

When y is 320 and x is 4.

Work out the value of x when y is 135

[3 marks]

$y = k \times x^3$

$320 = k \times 64$

$\frac{320}{64} = k$

$5 = k$

$135 = 5 \times x^3$

$27 = x^3$

$x = 3$

Answer 3

16

(a) Express $x^2 + 8x - 10$ in the form $(x + p)^2 - q$ **[2 marks]**

$(x+4)^2 - 10 - 16$

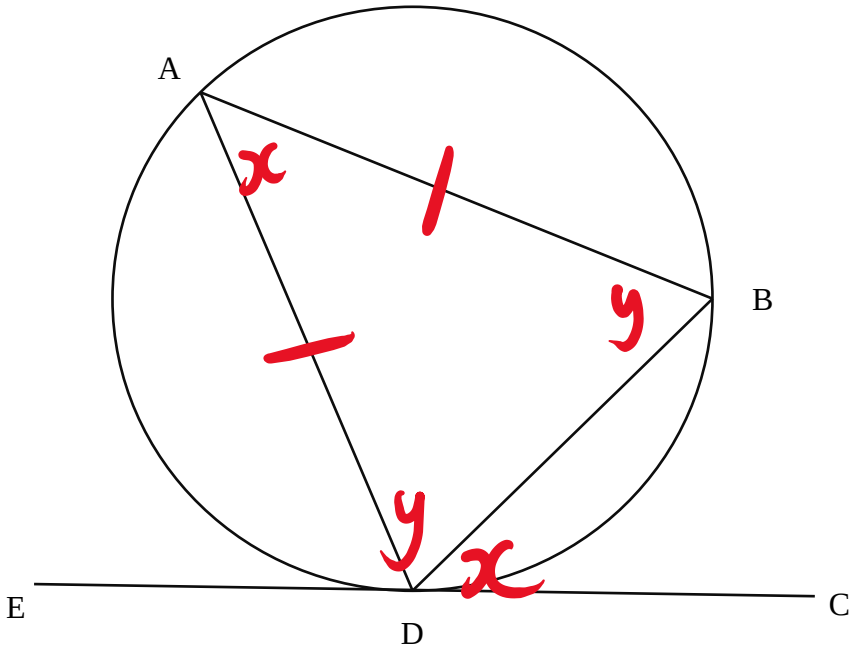
Answer $(x+4)^2 - 26$

(b) Hence, or otherwise, write down the turning point for $y = x^2 + 8x - 10$

[1 mark]

Answer $(-4, -26)$

17



Points ABD are on a circle such that:
AB = AD
Angle ABD = y^o
Angle BDC = x^o

Show that $\frac{1}{2}x + y = 90$

[3 marks]

$x + 2y = 180$

$\frac{1}{2}x + y = 90$

Answer _____

18 Rationalise the denominator

$$\frac{20+\sqrt{45}}{\sqrt{5}}$$

Give your answer in the form $a\sqrt{b}+c$

[3 marks]

$$\frac{20\sqrt{5}+\sqrt{225}}{5}$$

$$\frac{20\sqrt{5}+15}{5} = 4\sqrt{5}+3$$

Answer _____

19 Simplify fully

$$\frac{12x^2-8}{6x^2-4}$$

$$\frac{2(6x^2-4)}{} = \frac{2}{1} = 2$$

[2 marks]

Answer 2

20 A circle ***C*** has the equation $x^2 + y^2 = r^2$

The point ***A*** with coordinates $(6,8)$ lies on ***C.***

(a) Work out the length of the diameter of ***C***

[3 marks]

$6^2+8^2=r^2$

$36+64=r^2$

$100=r^2$

$10=r$

Answer 20

(b) The tangent to circle C passes through the point $(6,8)$.

Work out the equation of the tangent.

[4 marks]

$\frac{8-0}{6-0} = \frac{8}{6} = \frac{4}{3}$

$y = -\frac{3}{4}x + c$

$8 = -\frac{3}{4} \times 6 + c$

$8 = \frac{-18}{4} + c$

Answer $y = -\frac{3}{4}x + 12.5$

$c = 12.5$

21
There are 20 pupils in a class.
x are girls and the rest are boys.

$g = x$
$b = 20 - x$

Two pupils are going to be selected at random.

Work out the probability of selecting 1 girl and 1 boy, giving your answer in terms of x, in its simplest form.

[5 marks]

$P(g,b) = \frac{x}{20} \times \frac{20-x}{19} = \frac{20x-x^2}{380}$

$+$

$P(b,g) = \frac{20-x}{20} \times \frac{x}{19} = \frac{20x-x^2}{380}$

$\frac{40x-2x^2}{380} = \frac{20x-x^2}{190}$

Answer _____

22 Solve

$$y + 5 = 2x$$
$$x^2 = 2y + 31$$

$y = 2x - 5$

You **must** show your working.

[6 marks]

$x^2 = 2(2x-5) + 31$

$x^2 = 4x - 10 + 31$

$x^2 = 4x + 21$

$x^2 - 4x - 21 = 0$

$(x-7)(x+3) = 0$

$x = 7 \quad x = -3$

$y = 2(7) - 5 = 9$

$y = 2(-3) - 5 = -11$

$x =$ 7 $\quad y =$ 9

or $x =$ −3 $\quad y =$ −11

23 $f(x) = 3x^2 - 2$ $g(x) = 2x + 3$

$g^{-1}(x) = \frac{x-3}{2}$

(a) Find fg(2) **[2 marks]**

$2(2)+3=7$

$3(7)^2-2 = 145$

Answer 145

(b) Find $f^{-1}(x)$ **[2 marks]**

$y = 3x^2 - 2$

$x = 3y^2 - 2$

$\sqrt{\frac{x+2}{3}} = y$

Answer $f^{-1}(x) = \sqrt{\frac{x+2}{3}}$

(c) Solve $fg(x) = g^{-1}(5)$ **[4 marks]**

$3(2x+3)^2 - 2 =$

$3(4x^2+12x+9)-2 = 1$

$12x^2+36x+27-2 = 1$

$12x^2+36x+24 = 0$

$x^2+3x+2 = 0$

$(x+1)(x+2)$

Answer $x = -1$ $x = -2$