

Eduqas style

WJEC Eduqas GCSE (9-1) Mathematics

Component 1: Non-Calculator Mathematics (Higher Tier) Practice Paper

C300UA0-1 · Higher Tier · Practice paper

Time allowed: 2 hours 15 minutes

Candidate name	
Centre number	
Candidate number	

Materials

- The use of a calculator is not permitted in this examination.
- A ruler, a protractor and a pair of compasses may be required.
- The Eduqas additional formulae sheet for Higher tier should be provided.
- You must not use a calculator.

Instructions

- Use black ink or black ball-point pen. Do not use gel pen or correction fluid.
- You may use a pencil for graphs and diagrams only.
- Write your name, centre number and candidate number in the spaces provided.
- Answer all the questions in the spaces provided.
- If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

Information

- You should give details of your method of solution when appropriate.
- Unless stated, diagrams are not drawn to scale.
- Scale drawing solutions will not be acceptable where you are asked to calculate.
- The number of marks is given in brackets at the end of each question or part-question.
- You are reminded of the need for good English and orderly, clear presentation in your answers.
- The total mark for this paper is 120.

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Component 1 (Higher Tier)

Answer all questions. Time allowed: 2 hours 15 minutes.

1

(a) Work out $2\frac{2}{5} \times 1\frac{7}{8}$.

Give your answer as a mixed number in its simplest form.

[2]

(b) Work out $5\frac{1}{6} - 2\frac{3}{4}$.

Give your answer as a mixed number in its simplest form.

[2]

2

(a) Express 252 as a product of its prime factors.

Give your answer in index form.

[2]

(b) A florist has 84 roses and 126 lilies.

She makes identical bunches using all of the flowers. Each bunch has the same number of roses and the same number of lilies.

What is the greatest number of bunches she can make?

How many flowers are in each bunch?

[3]

3 The interior angle of a regular polygon is 4 times the size of its exterior angle.

How many sides does the polygon have?

You must show all your working.

[4]

4 In a car park, $\frac{2}{5}$ of the cars are silver.

The rest of the cars are black or red in the ratio 1 : 2.

There are 24 black cars.

How many cars are in the car park altogether?

You must show all your working.

[4]

5 4 identical pumps can empty a tank in 9 hours.

4 pumps start to empty the tank. After 3 hours, 2 more identical pumps are switched on.

How many hours in total does it take to empty the tank?

[3]

6

(a) Calculate $(3.5 \times 10^4) \times (6 \times 10^{-7})$.

Give your answer in standard form.

[2]

(b) Calculate $(4.8 \times 10^6) + (5.2 \times 10^5)$.

Give your answer in standard form.

[2]

7 By rounding each number to 1 significant figure, find an estimate for

$$(4.12^2 \times 19.6) \div 0.0517$$

You must show all your working.

[3]

8 Solve $(x + 7)/3 = (3x - 1)/4 + 1$.

You must show all your working.

[4]

9 A sports club has 80 members.

35 of the members are male.

32 of the members go swimming.

14 of the male members go swimming.

(a) Complete a two-way table to show this information.

Use columns 'Swims' and 'Does not swim', rows 'Male' and 'Female', and include totals.

[3]

	Swims	Does not swim	Total
Male			
Female			
Total			

(b) A member is chosen at random.

Find the probability that the member is female and does not swim.

[2]

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(c) A member who swims is chosen at random.

Find the probability that this member is female.

[2]

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10 A right-angled triangle has sides of length x cm, $(x + 7)$ cm and $(x + 8)$ cm.

The hypotenuse is $(x + 8)$ cm.

[Diagram: right-angled triangle with the two shorter sides labelled x cm and $(x + 7)$ cm and the hypotenuse labelled $(x + 8)$ cm. Diagram not drawn to scale.]

(a) Show that $x^2 - 2x - 15 = 0$.

[2]

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(b) Solve $x^2 - 2x - 15 = 0$ by factorising.
Hence find the perimeter of the triangle.

[4]

11

(a) Show that $0.3888... = 7/18$.

[3]

(b) Write $0.045045045...$ as a fraction in its simplest form.

[2]

12

(a) Show that $\sqrt{98} - \sqrt{32} = 3\sqrt{2}$.

[2]

(b) Expand and simplify $(5 - \sqrt{2})(3 + \sqrt{2})$.

[2]

(c) Rationalise the denominator of $(4 + \sqrt{3})/(2 - \sqrt{3})$.

Give your answer in the form $a + b\sqrt{3}$, where a and b are integers.

[3]

13

(a) Find the value of $(27/8)^{-2/3}$.

[2]

(b) Solve $9^{x+1} = 27^{x-1}$.

[3]

14 A sector of a circle has radius 12 cm and angle 150° .

Find the arc length of the sector.

Give your answer in terms of π .

[2]

15 Line L_1 has equation $y = \frac{1}{2}x + 3$.

Line L_2 has equation $y = -2x + 8$.

(a) Find the coordinates of the point where line L_1 meets line L_2 .

[3]

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(b) Find the coordinates of the point where line L_2 crosses the x-axis. **[1]**

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(c) Line L_3 is perpendicular to L_1 and passes through the point $(-1, 5)$.
Find the equation of line L_3 .
Give your answer in the form $y = mx + c$. **[3]**

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16 Two groups of adults took a reaction test. The table summarises their reaction times, in milliseconds.

	Minimum	Lower quartile	Median	Upper quartile	Maximum
Group X	180	220	260	300	380
Group Y	240	280	300	320	360

(a) Compare the reaction times of the two groups.
You should make two comparisons, one of which must use a measure of spread. **[3]**

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(b) A scientist wants to estimate the number of fish in a lake.
She catches 40 fish, marks them and returns them to the lake.
Later she catches 50 fish. 8 of these are marked.

Estimate the number of fish in the lake. **[2]**

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(c) State one assumption you made in part (b). **[1]**

17

(a) Write $3x^2 - 12x + 5$ in the form $a(x + b)^2 + c$. **[3]**

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(b) Hence write down the coordinates of the turning point of the graph of $y = 3x^2 - 12x + 5$. **[1]**

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

ABCD is a cyclic quadrilateral.

Angle $ADC = 112^\circ$.

O lies inside triangle ABC.

[Diagram: circle centre O with cyclic quadrilateral ABCD; radii OA and OC drawn. Angle $ADC = 112^\circ$. Diagram not drawn to scale.]

(a) Find the size of angle ABC.
Give a reason for your answer. **[2]**

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(b) O is the centre of the circle.
Find the size of angle OAC.
You must give a reason for each step of your working. **[3]**

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19

(a) Simplify fully $(3x^2 - 10x - 8)/(x^2 - 16)$. **[3]**

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(b) Solve $6/(x - 2) - 2/(x + 3) = 1$.
You must show all your working. **[5]**

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20 A bag contains 3 red balls, 5 blue balls and 2 white balls only.

(a) Two balls are taken at random from the bag without replacement.
Find the probability that both balls are the same colour. **[4]**

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(b) A different bag contains n counters. 6 of the counters are red.
Two counters are taken at random from this bag without replacement.
The probability that both counters are red is $\frac{1}{3}$.

Show that $n^2 - n - 90 = 0$ and hence find the value of n . **[5]**

21 OAB is a triangle.

OA = $\mathbf{a}$ and OB = $\mathbf{b}$ (vectors).

P is the point on AB such that AP : PB = 1 : 2.

[Diagram: triangle OAB with O at the bottom left, A at the bottom right and B at the top. P is on AB, one third of the way from A to B. Diagram not drawn to scale.]

(a) Find, in terms of $\mathbf{a}$ and $\mathbf{b}$, the vector AB. **[1]**

(b) Show that $\mathbf{OP} = \frac{1}{3}(2\mathbf{a} + \mathbf{b})$. **[2]**

(c) C is the point such that $\mathbf{OC} = 2\mathbf{a} + \mathbf{b}$.

Prove that O, P and C lie on a straight line. **[3]**

22

(a) $f(x) = (5x - 2)/(x + 1)$

Find $f^{-1}(x)$.

[3]

(b) The graph of $y = h(x)$ has a minimum point at $(-3, 4)$.

Write down the coordinates of the minimum or maximum point of each of these graphs.

(i) $y = h(x - 2)$

(ii) $y = h(-x)$

(iii) $y = -h(x)$

[3]

23

(a) Find the exact value of $\tan 60^\circ \times \cos 30^\circ - \sin 0^\circ$.

[2]

(b) In triangle ABC, angle $ABC = 90^\circ$, $AB = 7$ cm and angle $ACB = 30^\circ$.

Find the length of AC.

[2]

(c) In triangle PQR, $PQ = 4$ cm, $PR = 6$ cm and angle $QPR = 60^\circ$.
Show that $QR = 2\sqrt{7}$ cm.

[2]

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END OF QUESTIONS