cookie

Practice paper

GCSE Maths Higher, practice paper: Unit 1 (non-calculator) (WJEC style)

In the style of WJEC GCSE Mathematics (3300) Unit 1 Higher Tier

Practice paper written by cookie in the style of WJEC GCSE Mathematics (3300) Unit 1 Higher Tier. Not a WJEC paper; not affiliated with or endorsed by WJEC.

Time allowed: 1 hour 45 minutes

Total marks: 80

You must not use a calculator.

Name _____

Instructions

- Answer all the questions in the spaces provided.
- The use of a calculator is not permitted in this paper.
- Take π as 3.14.
- You should give details of your method of solution when appropriate.
- In question 2, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.
- There are no diagrams in this paper; shapes and graphs are described in words.

Information

- The marks for each question are shown in brackets at the end of each part.
- The maximum mark for this paper is 80.
- A formula list is on the last page.

Do it online, timed and marked:
cookie.education/past-papers/gcse/cookie/maths-wjec-style

Answer ALL questions. Write your answers in the spaces provided.

1 **(a)** Express 756 as a product of its prime factors.
Give your answer in index form.

Answer .....

(3)

(b) Find the smallest positive whole number n such that 756n is a cube number.

Answer .....

(1)

(Total for Question 1 is 4 marks)

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2 Gwen bakes bara brith (a fruit loaf) to sell at a market.
• The ingredients for 8 loaves cost £10.50.
• She pays £17 for her stall for the day.
One market day, Gwen bakes 48 loaves. She sells 42 of them for £3.20 each and gives the rest away.
Gwen says, 'My profit for the day is more than 2/3 of my total costs.'
Is Gwen correct? You must show all your working.
(4 of the marks are for the mathematics and 2 are for organisation, communication and accuracy in writing.)

Answer .....

(6)

(Total for Question 2 is 6 marks)

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3 **(a)** Work out $(7.2 \times 10^6) \div (9 \times 10^{-2})$.
Give your answer in standard form.

Answer .....

(2)

(b) Work out $5.4 \times 10^4 + 3.8 \times 10^3$.
Give your answer in standard form.

Answer .....

(2)

(Total for Question 3 is 4 marks)

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4 In a choir, the ratio of the number of men to the number of women is 4 : 5.
Six men join the choir and three women leave it.
There are now equal numbers of men and women in the choir.
How many people were in the choir before these changes?
You must show all your working.

Answer .....

(4)

(Total for Question 4 is 4 marks)

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5 The probability that Ffion's train is late on any day is 0.15.
Whether the train is late on one day is independent of whether it is late on any other day.
Ffion takes the train on Monday and on Tuesday.

(a) Calculate the probability that her train is late on both days.

Answer .....

(2)

(b) Calculate the probability that her train is late on exactly one of the two days.

Answer .....

(2)

(Total for Question 5 is 4 marks)

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6 A sector of a circle has radius 9 cm.
The angle at the centre of the sector is 80°.
Calculate the perimeter of the sector.
Take π as 3.14.

Answer .....

(3)

(Total for Question 6 is 3 marks)

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7 At a theatre, 2 adult tickets and 3 child tickets cost £39.50 altogether.
3 adult tickets and 5 child tickets cost £62 altogether.
Use an algebraic method to find the cost of an adult ticket and the cost of a child ticket.

Answer .....

(4)

(Total for Question 7 is 4 marks)

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8 Here are the first five terms of a quadratic sequence.
2 9 22 41 66

(a) Find an expression for the nth term of the sequence.

Answer .....

(3)

(b) Show that 300 is not a term of this sequence.

Answer .....

(2)

(Total for Question 8 is 5 marks)

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9 Write the recurring decimal 0.3181818… as a fraction in its simplest form.
(The digits 18 repeat for ever.)

Answer .....

(3)

(Total for Question 9 is 3 marks)

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10 (a) Find the value of $64^{-2/3}$.

Answer .....

(2)

(b) Expand and simplify $(2\sqrt{3} - 1)^2$.

Answer .....

(2)

(c) Write $15/\sqrt{5} + \sqrt{45}$ in the form $k\sqrt{5}$, where k is a whole number.

Answer .....

(2)

(Total for Question 10 is 6 marks)

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11 (a) Factorise $6x^2 - 7x - 20$.

Answer .....

(2)

(b) Hence solve the equation $6x^2 - 7x - 20 = 0$.

Answer .....

(1)

(c) Simplify $(4x^2 - 25)/(2x^2 + x - 15)$.

Answer .....

(3)

(Total for Question 11 is 6 marks)

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12 A histogram shows the times, t minutes, that a group of patients waited at a clinic.
The table gives the frequency density of each bar of the histogram.

Time, t minutes	**Frequency density**
$0 < t \leq 10$	1.2
$10 < t \leq 15$	3.6
$15 < t \leq 20$	4.0
$20 < t \leq 30$	2.2
$30 < t \leq 50$	0.4

(a) Calculate the number of patients in the group.

Answer .....

(2)

(b) Estimate the median waiting time.

Answer .....

(2)

(Total for Question 12 is 4 marks)

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13 Two jugs are mathematically similar.
The smaller jug has a capacity of 250 cm^3.
The larger jug has a capacity of 1024 cm^3.
The outside surface area of the smaller jug is 75 cm^2.
Calculate the outside surface area of the larger jug.

Answer .....

(3)

(Total for Question 13 is 3 marks)

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14 A rectangle has an area of 60 cm^2, correct to the nearest 5 cm^2.
Its length is 8 cm, correct to the nearest centimetre.
Calculate the upper bound for the width of the rectangle.

Answer .....

(3)

(Total for Question 14 is 3 marks)

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15 A, B, C and D are points on the circumference of a circle with centre O, in that order, so ABCD is a cyclic quadrilateral.
Angle BAD = 68°.
The tangents to the circle at B and at D meet at the point T.

(a) Find the size of angle BCD.
Give a reason for your answer.

Answer .....

(2)

(b) Find the size of angle BTD.
Give a reason for each step of your working.

Answer .....

(3)

(Total for Question 15 is 5 marks)

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16 Make m the subject of the formula
$5(m - k) = n(2m + 3)$

Answer .....

(4)

(Total for Question 16 is 4 marks)

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17 The curve y = f(x) is U-shaped. Its only turning point is a minimum at (−3, −4).
The curve crosses the x-axis at (−5, 0) and at (−1, 0).

(a) Write down the coordinates of the turning point of the curve y = 3f(x).

Answer .....

(1)

(b) Write down the coordinates of the points where the curve y = f(x + 4) crosses the x-axis.

Answer .....

(1)

(c) Write down the coordinates of the turning point of the curve y = f(½x).

Answer .....

(1)

(Total for Question 17 is 3 marks)

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18 A pencil case contains n pens. Exactly 4 of the pens are red.
Owain takes two pens at random from the pencil case, without replacement.
The probability that both pens are red is 1/11.

(a) Show that $n^2 - n - 132 = 0$.

Answer .....

(3)

(b) Find the number of pens in the pencil case.

Answer .....

(2)

(Total for Question 18 is 5 marks)

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19 Solve the equation
$x/(x + 2) + 5/(x - 2) = 2$
You must show all your working.

Answer .....

(4)

(Total for Question 19 is 4 marks)

END OF QUESTIONS

Formula list

Area of a trapezium = 1/2 (a + b)h

Volume of a prism = area of cross-section × length

Volume of a sphere = 4/3 πr^3

Surface area of a sphere = $4\pi r^2$

Volume of a cone = 1/3 $\pi r^2 h$

Curved surface area of a cone = $\pi r l$

In any triangle ABC: sine rule $a/\sin A = b/\sin B = c/\sin C$; cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$; area of triangle = 1/2 $ab \sin C$

The quadratic equation: the solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by $x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$

Annual Equivalent Rate (AER): AER, as a decimal, is calculated using the formula $(1 + i/n)^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.