cookie

Practice paper

GCSE Maths Higher, practice paper 1 (non-calculator) (AQA style)

In the style of AQA GCSE Mathematics (8300) Paper 1 Higher

Practice paper written by cookie in the style of AQA GCSE Mathematics (8300) Paper 1 Higher. Not an AQA paper; not affiliated with or endorsed by AQA.

Time allowed: 1 hour 30 minutes

Total marks: 80

You must not use a calculator.

Name _____

Instructions

- Answer all questions.
- Answer the questions in the spaces provided.
- You must not use a calculator.
- In all calculations, show clearly how you work out your answer.
- The marks for each question are shown in brackets.
- The maximum mark for this paper is 80.
- Diagrams are not used in this paper; where a shape is needed it is described in words.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this paper is 80.

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

Answer all questions in the spaces provided.

0 1 What is the reciprocal of 0.4?
Circle your answer.

A 4 B 2.5 C 0.25 D −0.4

[1 mark]

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0 2 Which expression is equivalent to $(2x^3)^2$?
Circle your answer.

A $4x^6$ B $2x^6$ C $4x^5$ D $2x^9$

[1 mark]

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0 3 Which of these numbers is irrational?
Circle your answer.

A $\sqrt{16}$ B 0.777… (0.7 recurring)

C $\sqrt{2} \times \sqrt{8}$ D π

[1 mark]

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0 4 What is the size of one interior angle of a regular hexagon?
Circle your answer.

A 60° B 108° C 120° D 135°

[1 mark]

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0 5 . 1 Write 0.000 504 in standard form.

[1 mark]

Answer .....

0 5 . 2 Work out $(3 \times 10^4) \times (8 \times 10^{-7})$
Give your answer in standard form.

[2 marks]

Answer .....

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0 6 Work out 2 3/4 ÷ 1 5/6
Give your answer as a mixed number in its simplest form.

[3 marks]

Answer .....

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0 7 Ana, Ben and Cal share some money.
The ratio of Ana's share to Ben's share is 2 : 3
The ratio of Ben's share to Cal's share is 4 : 5
Cal gets £56 more than Ana.
Work out the total amount of money they share.

[4 marks]

Answer .....

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0 8 . 1 The price of a bike is increased by 20%.
The new price is then decreased by 15%.
Work out the overall percentage change in the price of the bike.
State whether it is an increase or a decrease.

[2 marks]

Answer .....

0 8 . 2 In a sale, all prices are reduced by 20%.
The sale price of a coat is £64.
Work out the price of the coat before the sale.

[2 marks]

Answer .....

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0 9 Expand and simplify $(x + 5)(x - 3)(2x + 1)$

[3 marks]

Answer .....

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1 0 . 1 Work out the value of $27^{2/3}$

[2 marks]

Answer .....

1 0 . 2 Work out the value of $8^{-1/3}$
Give your answer as a fraction.

[1 mark]

Answer .....

1 0 . 3 Simplify fully $(x^5y^{-2})^3 \div (x^4y)$

[2 marks]

Answer .....

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11 The table shows information about the times, t minutes, that 20 people took to travel to work.

Time, t (minutes)	Frequency
$0 < t \leq 10$	4
$10 < t \leq 20$	7
$20 < t \leq 30$	6
$30 < t \leq 40$	3

11.1 Work out an estimate of the mean time.

[4 marks]

Answer .....

11.2 Explain why your answer to part (a) is only an estimate.

[1 mark]

Answer .....

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12 Solve the simultaneous equations

$3x + 2y = 4$

$5x - 3y = 13$

You must show your working.

[4 marks]

Answer .....

13.1 Triangle ABC has a right angle at B.
AB = 6 cm
Angle ACB = 30°
Work out the length of AC.

[2 marks]

Answer .....

13.2 Show that sin 60° × tan 30° = 1/2

[2 marks]

Answer .....

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14 A bag contains 4 red counters and 6 blue counters only.
Two counters are taken at random from the bag, without replacement.
Work out the probability that the two counters are different colours.

[3 marks]

Answer .....

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15 A solid cone has base radius 5 cm and slant height 13 cm.
Volume of a cone = 1/3 × π × r^2 × h, where r is the base radius and h is the perpendicular height.
Work out the volume of the cone.
Give your answer in terms of π.

[3 marks]

Answer .....

16 y is inversely proportional to the square of x.
When x = 4, y = 5
Work out the value of y when x = 10

[3 marks]

Answer .....

17 A histogram is drawn to show information about the heights, h cm, of some plants.
The table gives the class intervals and the frequency density for each bar of the histogram.

Height, h (cm)	Frequency density
0 < h ≤ 10	1.2
10 < h ≤ 15	3.6
15 < h ≤ 25	2.0
25 < h ≤ 40	0.8

17.1 Work out the number of plants in the sample.

[2 marks]

Answer .....

17.2 Work out an estimate of the number of plants that are more than 20 cm tall.

[2 marks]

Answer .....

18.1 Simplify $\sqrt{75} - \sqrt{12}$

[2 marks]

Answer .....

18.2 Rationalise the denominator and simplify fully $6/(3 - \sqrt{3})$

[3 marks]

Answer .....

19.1 Write $x^2 - 8x + 3$ in the form $(x - a)^2 - b$, where a and b are integers.

[2 marks]

Answer .....

19.2 Write down the coordinates of the turning point of the graph of $y = x^2 - 8x + 3$

[1 mark]

Answer .....

19.3 Hence, or otherwise, solve $x^2 - 8x + 3 = 0$
Give your answers in the form $p \pm \sqrt{q}$

[1 mark]

Answer .....

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20 $f(x) = 2x - 3$
$g(x) = x^2 + 1$

20.1 Work out $fg(2)$

[1 mark]

Answer .....

2 0 . 2 Find $f^{-1}(x)$

[2 marks]

Answer .....

2 0 . 3 Solve $gf(x) = 10$

[3 marks]

Answer .....

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21 Solve $x^2 - x - 12 < 0$

[3 marks]

Answer .....

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22 Prove algebraically that the difference between the squares of any two consecutive odd numbers is always a multiple of 8

[3 marks]

Answer .....

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23 A circle has centre (0, 0) and passes through the point P(5, 12).
The line L is the tangent to the circle at P.
Work out the equation of L.
Give your answer in the form ax + by = c, where a, b and c are integers.

[4 marks]

Answer .....

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24 OAB is a triangle.
The vector from O to A is a and the vector from O to B is b.
M is the midpoint of AB.
P is the point on OA such that OP : PA = 2 : 1
Work out the vector from P to M, in terms of a and b.
Give your answer in its simplest form.

[3 marks]

Answer .....

END OF QUESTIONS