

Maths Entry Assessment

Name Date Score

Time: about 70 minutes. Hampstead Tuition Centre - Year 10 Maths Entry Assessment (GCSE Higher). You have 70 minutes. Answer every question and show full working - method marks are available. Calculators are NOT allowed unless a question says otherwise. Leave surds in exact form (write 'root 50' style) and use ^ for powers. The final questions are genuine stretch; attempt as much as you can. Show your working where you can. Marks for each question are shown in brackets, like [2]. Total marks: **47**.

- 1 Work out $2\frac{3}{5} - 1\frac{1}{4}$, giving your answer as a mixed number in its simplest form. [2]

WORKING

Answer

FRACTIONS

- 2 Simplify fully $(3a^2b)^3$. [2]

WORKING

Answer

INDEX LAWS

- 3 Expand and simplify $(2x - 3)(x + 5)$. [2]

WORKING

Answer

EXPANDING BRACKETS

- 4 Factorise fully $x^2 - 7x + 12$. [2]

WORKING

Answer

FACTORISING QUADRATICS

- 5 Solve the simultaneous equations: $3x + 2y = 16$ and $5x - 2y = 8$.

[3]

WORKING

Answer _____

SIMULTANEOUS EQUATIONS

- 6 Write 0.000 0432 in standard form, and work out $(3 \times 10^5) \times (8 \times 10^{-9})$, giving each answer in standard form.

[3]

WORKING

Answer _____

STANDARD FORM

- 7 Make r the subject of the formula $V = \frac{1}{3} \pi r^2 h$.

[3]

WORKING

Answer _____

REARRANGING FORMULAE

- 8 A right-angled triangle has its right angle at B. $AB = 6$ cm and $BC = 8$ cm. Calculate the length of AC, and the size of angle BAC to 1 decimal place.

[4]

WORKING

Answer _____

PYTHAGORAS AND TRIGONOMETRY

- 9 Simplify $\sqrt{50} + \sqrt{18}$, giving your answer in the form $k\sqrt{2}$.

[3]

WORKING

Answer _____

SURDS

- 10 The n th term of a sequence is given by $n^2 + 4$. The n th term of a different sequence is $4n + 1$. Find the value(s) of n for which both sequences give the same term, and state that common term.

[4]

WORKING

Answer _____

SEQUENCES AND QUADRATICS (REASONING)

- 11 Solve the quadratic equation $2x^2 + 5x - 3 = 0$ by factorising.

[3]

WORKING

Answer _____

SOLVING QUADRATICS

- 12 £5000 is invested at 4% per year compound interest. Work out the total value of the investment after 3 years, to the nearest penny. (You may treat 1.04^3 as 1.124864.)

[3]

WORKING

Answer _____

COMPOUND INTEREST

- 13 Two bags of counters: Bag A has 3 red and 2 blue; Bag B has 4 red and 1 blue. One counter is taken at random from each bag. Work out the probability that the two counters are the same colour. [4]

WORKING

Answer _____

PROBABILITY (COMBINED EVENTS)

- 14 Show that the line $y = 2x + 1$ does not cross the curve $y = x^2 + 5$ at any point (i.e. they do not intersect). Give clear algebraic reasoning. [3]

WORKING

Answer _____

DISCRIMINANT / LINE AND CURVE (STRETCH)

- 15 Simplify fully $(x^2 - 9) / (x^2 + x - 6)$. [3]

WORKING

Answer _____

ALGEBRAIC FRACTIONS (STRETCH)

- 16 A solid is made of a cylinder of radius r and height $2r$ with a hemisphere of radius r on top. Show that the total volume can be written as $(8/3) \pi r^3$. (Volume of cylinder = $\pi r^2 h$; volume of a sphere = $(4/3) \pi r^3$.) [3]

WORKING

Answer _____

VOLUME / 'SHOW THAT' (STRETCH)

End of assessment. Hand your paper back when you are finished. Well done!