

Number 2H Assessment

THE ANSWERS

Higher Level



14 - 15 only

Clip	Grade	Title of clip	Question(s)	Marked out of	Score	%
154.	5	Negative Indices	1 - 2	5	___	___
155.	5	Error Intervals	3 - 4	4	___	___
156.	5	Mathematical Reasoning	5 - 6	5	___	___
177.	6	Recurring Decimals to Fractions	7	4	___	___
188.	7	Fractional Indices.	10 - 11	8	___	___
189.	7	Recurring Decimals - Proof.	8 - 9	6	___	___
206.	8/9	Upper and Lower Bounds	12 - 15	14	___	___
207.	8/9	Surds	16 - 20	19	___	___

Out of 65

TOTAL
SCORE _____

Final
Percentage %

1) a) Find the value of 4^{-3} $\frac{1}{64}$ 1

b) Find the value of $2^{-5} \times 5^{-1}$ $\frac{1}{160}$ 2

2) Write these numbers in order of size, starting with the smallest.

2^0 2^{-1} 2^3 0.2 -2 2^{-2}
 -2 0.2 2^{-2} 2^{-1} 2^0 2^3 2

3) A number, x , rounded to 1 decimal place is 7.2

Write down the error interval of x .

$7.15 \leq x < 7.25$ 2

4) A number, x , rounded to 3 significant figures is 34600

Write down the error interval of x .

$34550 \leq x < 34650$ 2

5) Tony says, "Squaring an odd number **always** results in an even number."

Is he correct? No

Write down a calculation to support your answer.

e.g. $3^2 = 9$ which is an odd number. 2

6) P is an odd number.
 Q is an even number.

Explain why $P \times Q + 1$ is always an odd number.

odd \times even = even,
 so $P \times Q =$ even

even + 1 = odd,
 so $P \times Q + 1 =$ odd 3

7) Write each recurring decimal as an exact fraction in its simplest form.

a) $0.\dot{6}$
 $\frac{6}{9} = \frac{2}{3}$ 2

b) $0.\dot{3}\dot{7}\dot{2}$
 $\frac{372}{999} = \frac{124}{333}$ 2

8) Prove algebraically that $0.\dot{4}\dot{5} = \frac{5}{11}$

Let $x = 0.454545\dots$

$100x = 45.454545\dots \Rightarrow x = \frac{45}{99} = \frac{5}{11}$
 $-\quad x = 0.454545\dots$
 $99x = 45$ 3

9) Express the recurring decimal $0.7\dot{3}\dot{9}$ as a fraction in its simplest form.

Let $x = 0.7393939\dots$ $990x = 732$
 $100x = 73.9393939\dots$
 $-\quad x = 0.7393939\dots \Rightarrow x = \frac{732}{990} = \frac{122}{165}$ 3
 $99x = 73.2$

10) a) Find the value of $64^{\frac{2}{3}}$ 16 2

b) Find the value of $25^{-\frac{3}{2}}$ $\frac{1}{125}$ 3

11) If $16^x = \frac{1}{8}$, find the value of x .

$(2^4)^x = \frac{1}{2^3}$

$2^{4x} = 2^{-3}$
 $4x = -3$
 $x = -\frac{3}{4}$ 3

12) The weight of a football is 425 grams, to the nearest gram.

a) What is the minimum the weight could be?

424.5 g 1

b) What is the maximum the weight could be?

425.5 g 1

13) A rectangular field has a width of 37 metres, measured to the nearest metre.

a) What is the upper bound of the width?

37.5 m 1

The length of the field is 115 metres, measured to the nearest 5 metres.

b) Work out the upper bound for the perimeter of the field.

310 m 2

- 14) A ball is thrown vertically upwards with a speed, V , in metres per second.
The height, H , in metres, to which it rises is given by:
- $$H = \frac{V^2}{2g}$$

where g , in m^2/s , is the acceleration due to gravity.

$V = 34.3$ correct to 3 significant figures.
 $g = 9.8$ correct to 2 significant figures.

- a) What is the lower bound of g ?
9.75 1
- b) Calculate the upper bound of H .
Give your answer to 3 significant figures.

60.5 3

- 15) A floodlight tower is marked

WATTAGE NOT TO EXCEED 300 000 WATTS
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The spotlights on the tower are rated at 2500 watts each and the manufacturer can only guarantee accuracy to the nearest 100 watts.

- a) What is the maximum number of spotlights that can safely be put on the tower?

117 2

The formula $W = I^2 R$ connects W (watts), I (amps) and R (ohms).

For one of the spotlights, the value of I is 25 amps measured to 2 significant figures.

- b) What is the minimum possible value of R ?
Give your answer to 2 significant figures.

3.8 3

- 16) a) Write $\sqrt{8}$ in the form $m\sqrt{2}$ where m is an integer.

$2\sqrt{2}$ 1

- b) Write $\sqrt{75}$ in the form $k\sqrt{3}$ where k is an integer.

$5\sqrt{3}$ 2

- c) Rationalise $\frac{1}{\sqrt{5}}$

$\frac{\sqrt{5}}{5}$ 2

- d) Rationalise $\frac{3 + \sqrt{2}}{\sqrt{2}}$

$\frac{3\sqrt{2} + 2}{2}$ 3

- 17) Expand $\sqrt{3}(2 + \sqrt{3})$
Give your answer in the form $a + b\sqrt{3}$

$3 + 2\sqrt{3}$ 2

- 18) Expand and simplify $(\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5})$

-2 3

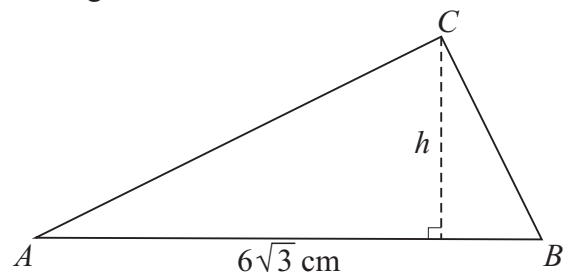
- 19) Show that $(\sqrt{18} + \sqrt{2})^2$ is an integer.

$$\begin{aligned} &= (\sqrt{18} + \sqrt{2})(\sqrt{18} + \sqrt{2}) \\ &= 18 + \sqrt{18}\sqrt{2} + \sqrt{18}\sqrt{2} + 2 \\ &= 20 + 2\sqrt{18}\sqrt{2} \\ &= 20 + 2\sqrt{36} \\ &= 20 + 12 \end{aligned}$$

32 3

- 20) The diagram shows a triangle ABC of area 36 cm^2 .

The length of AB is $6\sqrt{3} \text{ cm}$.



Calculate the perpendicular height (h) of the triangle.

Write your answer in the form $p\sqrt{3}$, where p is an integer.

$4\sqrt{3}$ 3