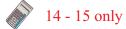# Number 2H Assessment

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} _____ **1**

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

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

   $2^0 \quad 2^{-1} \quad 2^3 \quad 0.2 \quad -2 \quad 2^{-2}$

   ___ ___ ___ ___ ___ ___ **2**

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

   Write down the error interval of x.

   _____ **2**

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

   Write down the error interval of x.

   _____ **2**

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

   Is he correct? _____

   Write down a calculation to support your answer.

   2

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

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

   3

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

   a) $0.\dot{6}$

   _____ **2**

   b) $0.\dot{3}7\dot{2}$

   _____ **2**

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

   3

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

   3

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

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

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

    $x =$ ____ **3**

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

    a) What is the minimum the weight could be?

    _____ g **1**

    b) What is the maximum the weight could be?

    _____ 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?

    _____ 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.

    _____ 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 m²/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?

_____ 1

b) Calculate the upper bound of H.
Give your answer to 3 significant figures.

_____ 3

15) A floodlight tower is marked

| WATTAGE **NOT** TO EXCEED |
| 300 000 WATTS |

The spotlights on the tower are rated at 2 500 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?

_____ 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
_____

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

_____ 1

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

_____ 2

c) Rationalise $\dfrac{1}{\sqrt{5}}$

_____ 2

d) Rationalise $\dfrac{3 + \sqrt{2}}{\sqrt{2}}$

_____ 3

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

_____ 2

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

_____ 3

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

_____ 3

20) The diagram shows a triangle ABC of area $36\,\text{cm}^2$.

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

Calculate the perpendicular height (h) of the triangle.
Write your answer in the form $p\sqrt{3}$, where p is an integer.

_____ 3