Indices and scientific notation NU 9-6

Name: _____ **Class:** _____

Due date: _____ **Parent's signature:** _____

Level 5 /10	Level 6 /20

Part A: Level 5

Rewrite the following calculator sequences in index form.

1 (2) (y^x) (5) (=) _____

2 (3) (y^x) (3) (×) (7) (=) _____

3 (() (5) (y^x) (2) ()) (y^x) (3) (=) _____

The powers of 2 end in this pattern: 2, 4, 8, 6, 2, 4, 8, 6 ...

4 What do the powers of 6 end in? _____

5 Can a number ending in 3 be a power of 9? _____

Make these statements true by inserting an =, > or < sign.

6 $3^2 \times 3^3$ _____ 3^5

7 2×2^3 _____ 4^3

8 $4^5 \times 5^4$ _____ 9^9

Circle the integers in each list.

9 $\sqrt{1000}$, $\sqrt{25}$, $\sqrt{8}$, $\sqrt{144}$, $\sqrt{48}$

10 $\sqrt{8} \times \sqrt{2}$, $\sqrt{6} \times \sqrt{10}$, $\sqrt{5} \times \sqrt{125}$, $\sqrt{7} \times \sqrt{700}$, $\sqrt{15} \times \sqrt{5}$

Part B: Level 6

Evaluate each of the following fully.

1 $10^2 + 10^2 + 10^2 =$ _____

2 $10^2 + 10^1 + 10^0 =$ _____

3 $3^2 - 2^3 =$ _____

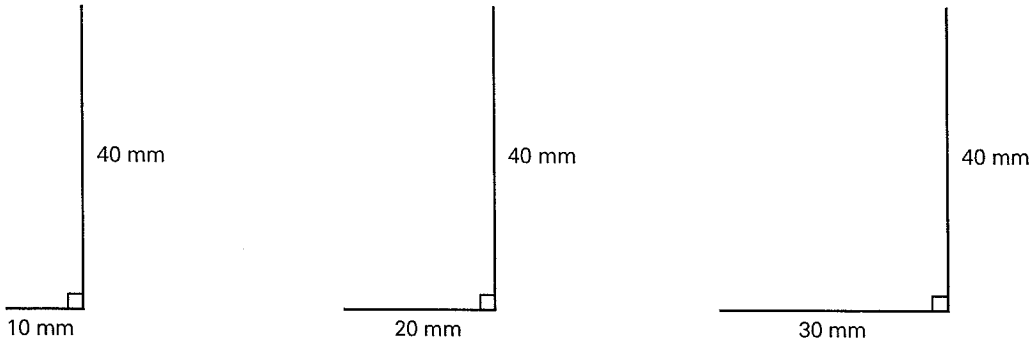
4 (4) (EXP) (2) (×) (2) (EXP) (6) (=) _____

5 $(3^6 \times 5^2) \div (10^2 \times 9^3) =$ _____

6 $\sqrt{16} \times \sqrt{49} \div \sqrt{196} =$ _____

7 $\sqrt{5^2} + \sqrt{81} =$ _____

Carefully draw a hypotenuse on each diagram to make it a right triangle. In each case calculate the length of the hypotenuse using Pythagoras' theorem and then check by measuring it to the nearest mm.



8 Calculated: _____ Measured: _____

9 Calculated: _____ Measured: _____

10 Calculated: _____ Measured: _____

Express each of the following in scientific notation.

11 Speed of light is 300 000 km/s = _____ km/s

12 Speed of sound is 340 m/s = _____ m/s

13 Distance light travels in 1 minute = _____ km

14 Distance sound travels in 1 minute = _____ m

15 Length of a bacterium is 0.000 001 4 m = _____ m

Rewrite as negative indices to base 2.

16 $\frac{1}{2}$ = _____

17 $\frac{1}{32}$ = _____

Rewrite as the product of negative indices of prime numbers.

18 $\frac{1}{8} \times \frac{1}{25} \times \frac{1}{81}$ = _____

19 $\frac{1}{225\,000}$ = _____

20 Put these numbers in ascending order.

33^3, 3^{33}, $(3^3)^3$, 33^{-3}, 3^{-33} _____, _____, _____, _____, _____

Puzzler

The number 5 can be written as the sum of two whole number squares, that is $5 = 2^2 + 1^2$.

Can you write the number 685 as the sum of two squares?

Vocabulary

Write the mathematical meanings of:

Integers _____

Positive indices _____

Negative indices _____

Scientific notation _____

Pythagoras' theorem _____

_____