



Age 14+ Level ★★
Worksheet 1

1. Rooted Via 10

Which of the numbers $3\sqrt{11}$, $4\sqrt{7}$, $5\sqrt{5}$, $6\sqrt{3}$, $7\sqrt{2}$ are greater than 10?

2. Largest Expression

Given that x is positive and less than 1, list the following expressions from smallest to largest:

$$x^2 + x \quad x^2 \quad x^3 \quad x^3 + x^2 \quad x^4$$

3. Doubly Powerful

To what power should we raise 4^4 to get 8^8 ?

4. Huge Powers

Put these numbers in order, from smallest to largest:

$$2^{800} \quad 3^{500} \quad 5^{400} \quad 6^{300}$$

5. Roots Near 9

Given that n is an integer, and the difference between $\sqrt{n}$ and 9 is less than 1, how many different possibilities are there for n ?

6. Rough Root

Which of these is closest to $\sqrt{\frac{10000}{2012}}$?

- a) 1.9 b) 2.2 c) 2.5 d) 2.7

7. Big Product

How many digits are in the product $2^{18} \times 5^{12}$?

8. How Many Squares

How many four digit whole numbers are perfect squares?

These problems are adapted from UKMT (ukmt.org.uk) and WMC (competition.ac) problems.



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Worksheet 2

1. Which Power

Which power of 16 is equal to 64^6 ?

2. Cube Factors

How many factors of 9^9 are perfect cubes?

3. Powerful Order

List the following three numbers in increasing order:

$$2^{25} \quad 8^8 \quad 3^{11}$$

4. Two in a Million

What is the highest power of 2 that divides exactly into 1 000 000?

5. Root Estimation

Without using a calculator, work out which of the following is the best approximation for

$$\sqrt{\frac{2001}{10000}}$$

0.4

0.42

0.45

0.47

6. Powerful Expression

Put these expressions in order from smallest to largest:

a) $2^7 + 2$

b) $2(4^3) - 2$

c) $8^2 + 4^3$

d) $8 \times 4 \times 2$

7. The Power of x

Find the value of x , where

$$2^{x+1} - 2^{x-1} = 12$$

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