Lesson 6

Year 6, Primary 6, Mathematics
Vulgar Fractions

Products of Primes

Prime Number Art
The Twenty-five primes less than 100

6.1 Six Prime Facts

- A prime number is a positive integer with two factors exactly.
- A positive integer with more than two factors is said to be ***composite***.
- The number 1 is neither prime nor composite.
- There are twenty-five primes less than 100.
- Primes are important because the composite numbers are built from primes.
- Primes are the atoms, the building blocks, of the mathematical universe.

6.2 The fundamental theorem of arithmetic

All composite numbers can be written as a product of primes.
The representation of any composite number in this way is essentially unique.

6.2.1 Examples

The numbers 50, 121 and 19669 are composite numbers.
This fundamental theorem of arithmetic tell us that they are built from prime numbers multiplied together.
Here are the decompositions of those numbers into products of primes.

(i) $12 = 2 \times 2 \times 3$

(ii) $121 = 11 \times 11$

(iii) $19669 = 13 \times 17 \times 89$

6.3 Exercise

Marks available : 40

Question 1

Write each of the following composite numbers as a product of prime numbers.

(i) $8 =$

[2 marks]

(ii) $10 =$

[2 marks]

(iii) $18 =$

[2 marks]

(iv) $50 =$

[2 marks]

(v) $99 =$

[2 marks]

(vi) $70 =$

[2 marks]

Question 2

Explain why the number 23 cannot be written as a product of primes.

[2 marks]

Question 3
The number 441 is not prime.
Prove this by finding a number other than 1 or 441 that divides into it.

[3 marks]

Question 4
Is 2557884 a prime number ?
Explain your answer.

[2 marks]

Question 5
Is 41087335 a prime number ?
Explain your answer.

[2 marks]

Question 6
The number 847 is not prime.
Prove this by finding a number other than 1 or 847 that divides into it.

[3 marks]

Question 7
I am thinking of an even number.
Could the number I am thinking of be prime ?
Explain your answer.

[3 marks]

Question 8

Make your own piece of prime number art, similar to that shown earlier.
You can cut numbers out of old newspapers and magazines.
Or, on a walk, take photographs of door numbers, price labels, car registration plates...
The space below is for you to construct your math-art.

[13 marks]