

# Reasoning and Problem Solving

## Step 4: Prime Numbers

### National Curriculum Objectives:

Mathematics Year 5: (5C5b) [Know and use the vocabulary of prime numbers, prime factors and composite \(non-prime\) numbers](#)

Mathematics Year 5: (5C8a) [Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Use 4 digit cards to make composite numbers up to 100.

**Expected** Use 4 digit cards to make composite numbers up to 50 with a specified prime factor.

**Greater Depth** Use 4 digit cards to make composite numbers up to 50 with prime factors that meet specified criteria.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Place numbers on a Venn diagram identifying prime and composite numbers up to 100.

**Expected** Place numbers on a Venn diagram identifying prime and composite numbers up to 100 and identifying the prime factors in numbers.

**Greater Depth** Place numbers on a Venn diagram identifying prime and composite numbers up to 100. Identify prime factors in numbers and recognise the sum of prime factors.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain whether a statement about prime or composite numbers up to 100 is correct.

**Expected** Explain whether a statement about prime or composite numbers up to 100 is correct, including identifying prime factors in numbers.

**Greater Depth** Explain whether a statement about prime or composite numbers up to 100 is correct, including identifying prime factors in numbers and recognising the sum of prime factors.

More [Year 5 Multiplication and Division](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

## Prime Numbers

1a. Choose from the digit cards below to create composite numbers up to 100.



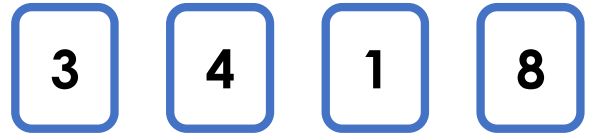
Find all the possibilities.



PS

## Prime Numbers

1b. Choose from the digit cards below to create composite numbers up to 100.



Find all the possibilities.

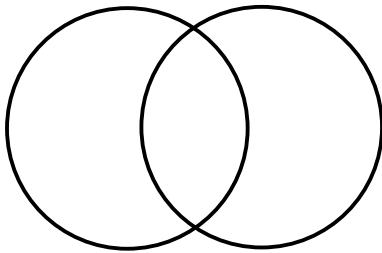


PS

2a. Place the numbers below on the Venn diagram.

Prime numbers

Multiples of 2

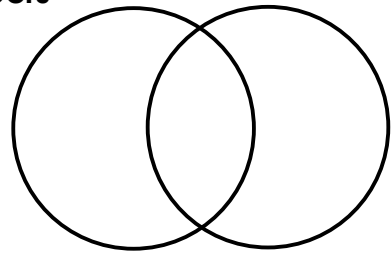


PS

2b. Place the numbers below on the Venn diagram.

Composite numbers

Multiples of 3



PS

3a. True or false?



Luna

The largest prime number less than thirty is 29.

Explain your answer.



R

3b. True or false?



Jacob

All odd numbers are prime numbers.

Explain your answer.

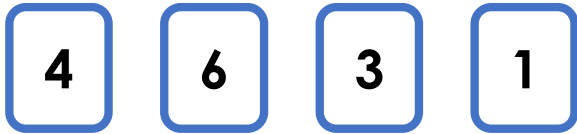


R

## Prime Numbers

## Prime Numbers

4a. Choose from the digit cards below to create composite numbers up to 50 that have a prime factor of 2.



Find all the possibilities.



PS

4b. Choose from the digit cards below to create composite numbers up to 50 that have a prime factor of 3.



Find all the possibilities.

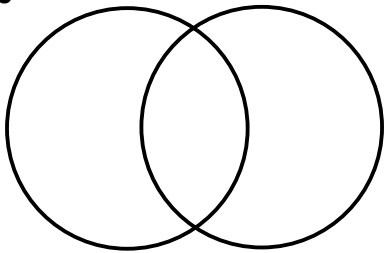


PS

5a. Place the numbers below on the Venn diagram.

Prime factors  
of 20

Prime factors  
of 30

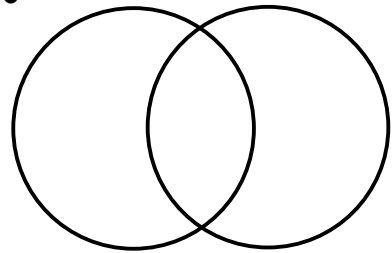


PS

5b. Place the numbers below on the Venn diagram.

Prime factors  
of 66

Prime factors  
of 63



PS

6a. True or false?



Alfie

Every odd composite number has 3 as a prime factor.

Explain your answer.



R

6b. True or false?



Grace

2 is the only even prime number.

Explain your answer.



R

## Prime Numbers

## Prime Numbers

7a. Choose from the digit cards below to create composite numbers up to 50 that have a 2-digit prime factor.

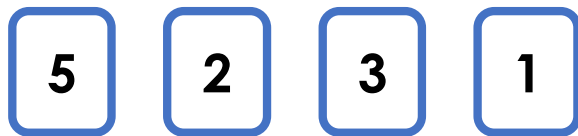


Find all the possibilities.



PS

7b. Choose from the digit cards below to create composite numbers up to 50 that have only two prime factors.



Find all the possibilities.

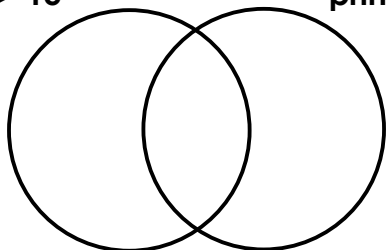


PS

8a. Place the numbers below on the Venn diagram.

Sum of prime factors > 15

Has 2 as a prime factor

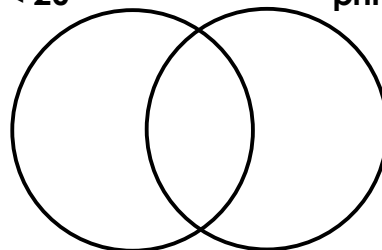


PS

8b. Place the numbers below on the Venn diagram.

Sum of prime factors < 20

Has 5 as a prime factor



PS

9a. True or false?



Judy

All 2-digit composite numbers have a prime factor of 2.

Explain your answer.



R

9b. True or false?



Theo

The sum of the prime factors of any composite number is always odd.

Explain your answer.



R

# Reasoning and Problem Solving

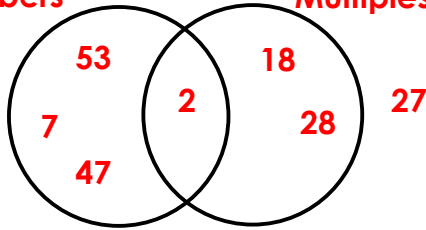
## Prime Numbers

### Developing

1a. 26, 27, 62, 69, 72, 76, 92, 96

2a. Prime numbers

Multiples of 2



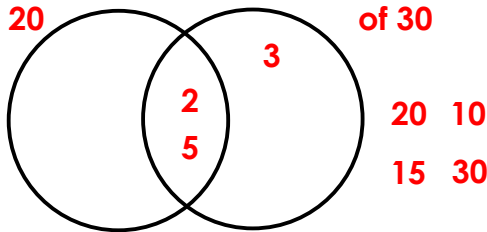
3a. True; 29 is only divisible by itself and 1 therefore it is a prime number. There is no larger prime number less than 30.

### Expected

4a. 4, 6, 14, 16, 34, 36, 46

5a. Prime factors of 20

Prime factors of 30



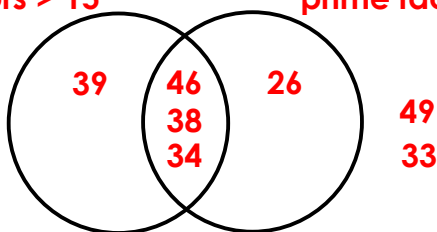
6a. False; 25, 35 and 49 do not have 3 as a prime factor.

### Greater Depth

7a. 34 and 46

8a. Sum of prime factors > 15

Has 2 as a prime factor



9a. False; all 2-digit even composite numbers have a prime factor of 2, all 2-digit odd composite numbers do not have a prime factor of 2.

# Reasoning and Problem Solving

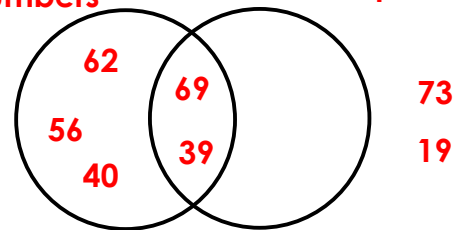
## Prime Numbers

### Developing

1b. 14, 18, 34, 38, 48, 81, 84

2b. Composite numbers

Multiples of 3



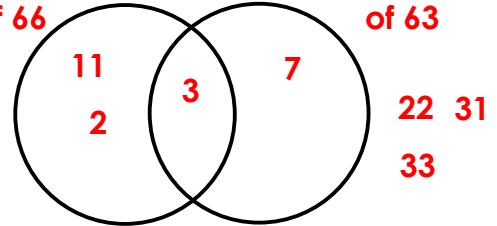
3b. False; while 2 is the only even prime number, many odd numbers are composite, for example, 15 is a multiple of 3 and 5.

### Expected

4b. 12, 18, 21, 27

5b. Prime factors of 66

Prime factors of 63



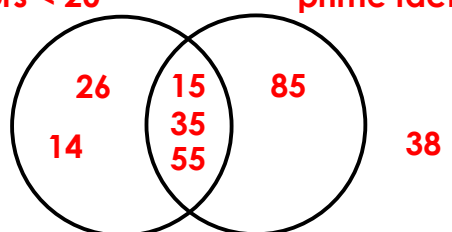
6b. True; all other prime numbers are odd, for example, 3, 5 and 7. All other even numbers are composite as they can be divided by 2.

### Greater Depth

7b. 15, 21, 25 and 35

8b. Sum of prime factors < 20

Has 5 as a prime factor



9b. False; the sum of the prime factors of any composite number can be odd or even. For example, the prime factors of 10 are 2 and 5 which make 7 altogether however the prime factors of 15 are 3 and 5 which make 8 altogether.