Planner

Multiples, factors and primes

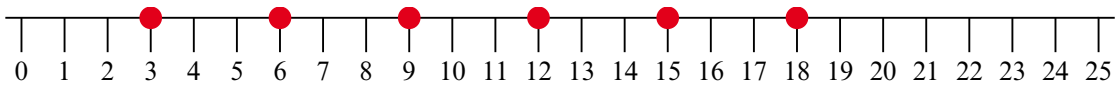
- Finding multiples of a number
- Finding all of the factors of a number
- Using the relationship between multiples and factors
- Recognising prime numbers and prime factors

Keywords

You should know

explanation 1

1 The red dots on the diagram show the first six multiples of 3.



a What is the difference between any multiple of 3 and the next multiple of 3?

b What are the next two multiples of 3 after 18?

c What is the tenth multiple of 3?

d What is the hundredth multiple of 3?

2 The multiples of 5 make a sequence. Write down:

a the first six terms **b** the tenth term **c** the twentieth term

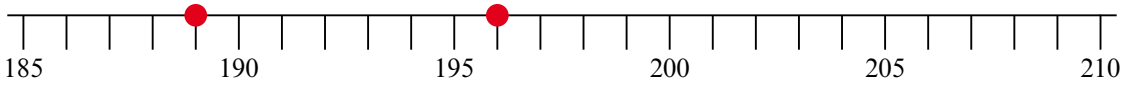
d the number of terms less than 60 **e** the largest term less than 200.

3 The multiples of 17 make a sequence. One term in the sequence is 323.

a What is the next term in the sequence?

b What is the previous term?

4 John thinks of a whole number that is greater than 1. The red dots below show multiples of John's number.



a What is John's number?

b Write down the next two multiples of this number after 196.

5 The square contains all the numbers from 1 to 49. Some of the numbers are hidden.

a Describe the numbers highlighted in yellow.

b How many multiples of 9 are shown?

c What is the largest multiple of 11 shown?

d The hidden numbers are multiples of the same number. What are the hidden numbers?

43		25	1		11	7
35	29	37		20	15	49
5	22	21	12	41	38	9
39	45	2	6	27	33	13
	30	18	26	36	4	31
44	28	42	34	3	47	17
	14	46	19	10		23

6 How many multiples of 3 would be shown on a 100 square?

explanation 2a explanation 2b online

7 Find the lowest common multiple of each set of numbers.

a 5, 3	**b** 8, 6	**c** 10, 5	**d** 4, 7
e 3, 9	**f** 12, 24	**g** 7, 8	**h** 20, 30
i 2, 4, 8	**j** 5, 10, 15	**k** 6, 8, 12	**l** 3, 4, 5

8 Describe each statement as true or false.

If the statement is false, give a counter-example.

a Any multiple of 8 is also a multiple of 4.

b Any multiple of 3 is also a multiple of 6.

c A common multiple of 6 and 4 is 24.

d You can always find a common multiple of a pair of numbers by multiplying them together.

e Multiplying a pair of numbers never gives their lowest common multiple.

9 The number 12 is the lowest common multiple of two numbers. One of those numbers is also 12. What is the other number? Write down as many possibilities as you can.

10 The hot tap alone will fill a bath in 6 minutes. The cold tap alone will take 4 minutes.

a Both taps are used together. Is the time needed to fill the bath more or less than 4 minutes?

b Find the lowest common multiple of 6 and 4.

c Explain why your answer to part **b** gives the time needed to fill the bath five times.

d How long would it take to fill the bath once?

explanation 3 online

11 Describe each of the following statements as true or false.
If the statement is true, write a multiplication that matches it.

The first one is done for you.

a 3 is a factor of 15 True, $3 \times 5 = 15$

b 8 is a factor of 32

c 9 is a factor of 27

d 6 is a factor of 14

e 11 is a factor of 32

f 16 is a factor of 48

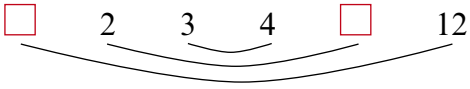
g 25 is a factor of 100

h 12 is a factor of 72

i 7 is a factor of 45

j 21 is a factor of 105

12 Copy and complete the diagram to show the factor pairs of 12.



13 Draw a diagram to show the factor pairs of each number.

a 24 **b** 32 **c** 27 **d** 56

14 List all the factors of each number.

a 30 **b** 28 **c** 60 **d** 108

e 125 **f** 72 **g** 84 **h** 64

15 3384 is a multiple of 72, and 36 is a factor of 72. Write two statements that connect 36 and 3384.

16 p and q represent whole numbers and p is a factor of q. Which of the statements *must* be true?

a q is a factor of p

b q is a multiple of p

c p is a factor of $2 \times q$

d q is a factor of $10 \times p$

explanation 4

17 Machine A takes two input numbers and gives their common factors as the output numbers.

Find the output for each input.

a 8, 12 **b** 15, 30 **c** 18, 24

d 24, 40 **e** 32, 128 **f** 27, 29

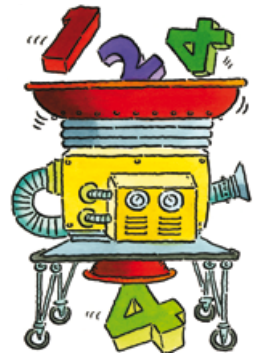
g 36, 45 **h** 27, 81 **i** 84, 144

Machine A

18 Machine B takes any number of input numbers. The highest input number is given as the output number.

a Put 36 and 45 into Machine A and then put the output values into Machine B. What is the output from Machine B?

b What is the connection between your answer to part **b** and the numbers 36 and 45?



Machine B

19 Find the highest common factor of each set of numbers.

a 12, 18 **b** 21, 42 **c** 33, 77 **d** 44, 88

e 35, 49 **f** 4000, 4500 **g** 26, 78 **h** 260, 780

i 8, 12, 24 **j** 30, 60, 75 **k** 44, 88, 121 **l** 36, 90, 180

20 **a** Write down two numbers. The smaller number must be the highest common factor of the pair of numbers.

b What is the lowest common multiple of the pair of numbers?

explanation 5

21 **a** Write down all the factors of each number.

i 2 **ii** 1 **iii** 7 **iv** 22

b Which of the numbers in part **a** are prime numbers?

22 **a** List all the prime numbers less than 20.

b How many even prime numbers are there?

23 **a** Find pairs of prime numbers that add together to make each of these numbers. Find as many pairs as you can.

i 12 **ii** 16 **iii** 24 **iv** 32

b Which of the numbers in part **a** can be written as the sum of two primes in only one way?

24 **a** Find a pair of prime numbers that multiply together to make each of these numbers.

i 21 **ii** 55 **iii** 26 **iv** 51 **v** 143 **vi** 38 **vii** 57 **viii** 95

b Is it possible to find a different answer for any of the numbers in part **a**?

25 List all the prime numbers between 20 and 50.

26 Twin primes are prime numbers that differ by 2.

The first pair of twin primes are 3 and 5.

Find the values of the next four twin primes.

explanation 6 — online

27 **a** Which factors of 12 are prime numbers?

b Copy and complete using the prime factors of 12.
$12 = \square \times \square \times \square$

You can use a factor more than once.

28 Copy and complete using the prime factors of each number.

a $10 = \square \times \square$

b $18 = \square \times \square \times \square$

c $8 = \square \times \square \times \square$

d $30 = \square \times \square \times \square$

e $36 = \square \times \square \times \square \times \square$

f $100 = \square \times \square \times \square \times \square$

29 Only one of the numbers below is prime. Which number is it and how do you know?

7870 7883 7864 7795