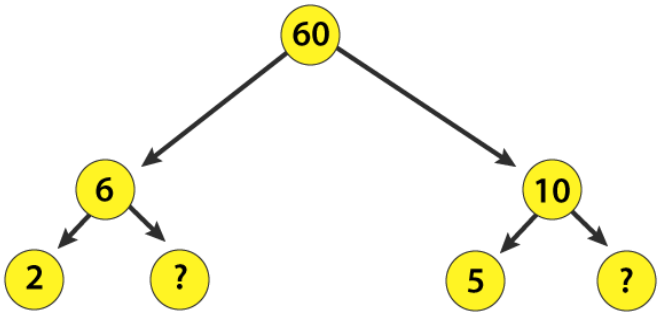
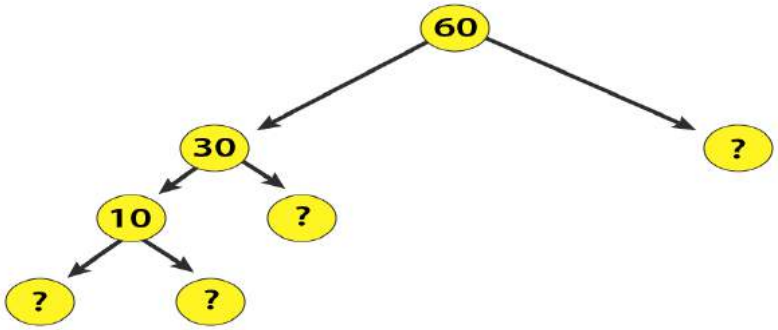
EXERCISE 3.5 PAGE NO: 61

1. Which of the following statements are true?
(a) If a number is divisible by 3, it must be divisible by 9.
(b) If a number is divisible by 9, it must be divisible by 3.
(c) A number is divisible by 18, if it is divisible by both 3 and 6.
(d) If a number is divisible by 9 and 10 both, then it must be divisible by 90.
(e) If two numbers are co-primes, at least one of them must be prime.
(f) All numbers which are divisible by 4 must also be divisible by 8.
(g) All numbers which are divisible by 8 must also be divisible by 4.
(h) If a number exactly divides two numbers separately, it must exactly divide their sum.
(i) If a number exactly divides the sum of two numbers, it must exactly divide the two numbers separately.
Solutions:
(a) False, 6 is divisible by 3 but is not divisible by 9
(b) True, as 9 = 3 × 3. Hence, if a number is divisible by 9, it will also be divisible by 3
(c) False. Since 30 is divisible by both 3 and 6 but is not divisible by 18
(d) True, as 9 × 10 = 90. Hence, if a number is divisible by both 9 and 10 then it is divisible by 90
(e) False. Since 15 and 32 are co-primes and also composite numbers
(f) False, as 12 is divisible by 4 but is not divisible by 8
(g) True, as 2 × 4 = 8. Hence, if a number is divisible by 8, it will also be divisible by 2 and 4
(h) True, as 2 divides 4 and 8 and it also divides 12 (4 + 8 = 12)
(i) False, since, 2 divides 12 but it does not divide 7 and 5

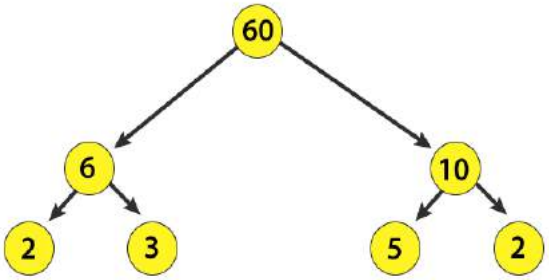
2. Here are two different factor trees for 60. Write the missing numbers.
(a)



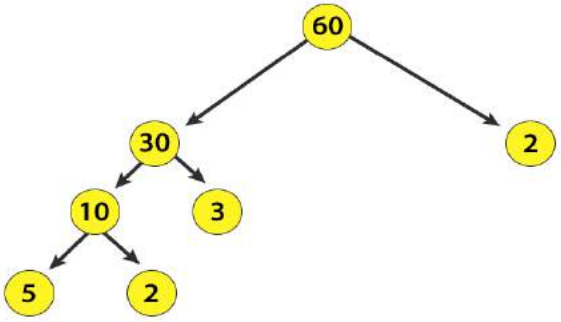
(b)



Solutions:
(a) Since, 6 = 2 × 3 and 10 = 5 × 2

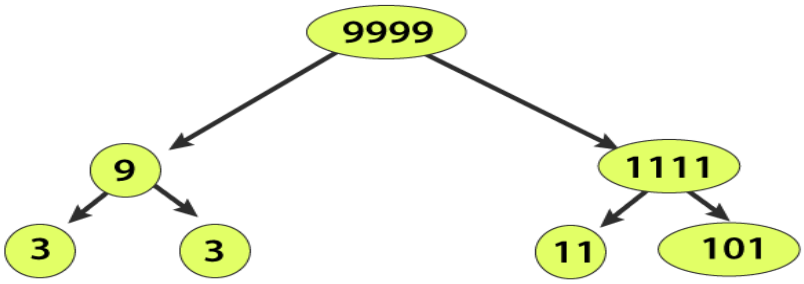


(b) Since, 60 = 30 × 2
30 = 10 × 3
10 = 5 × 2



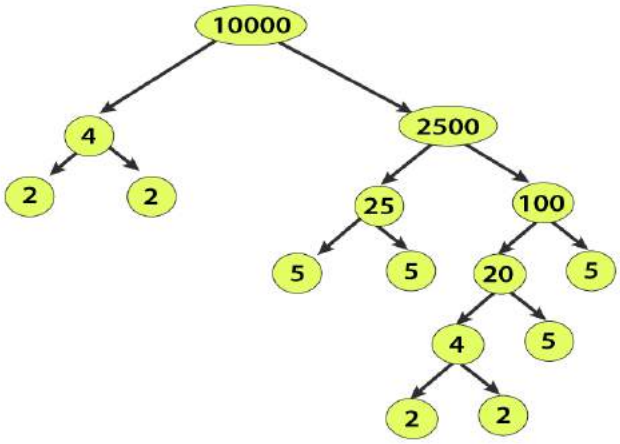
3. Which factors are not included in the prime factorisation of a composite number?
Solutions:
1 and the number itself are not included in the prime factorisation of a composite number.

4. Write the greatest 4-digit number and express it in terms of its prime factors.
Solutions:
The greatest four digit number is 9999
Therefore 9999 = 3 × 3 × 11 × 101



5. Write the smallest 5-digit number and express it in the form of its prime factors.
Solutions:

The smallest five digit number = 10000



10000 = 2 × 2 × 2 × 2 × 5 × 5 × 5 × 5

6. Find all the prime factors of 1729 and arrange them in ascending order. Now state the relation, if any; between two consecutive prime factors.
Solutions:

7	1729
13	247
19	19
	1

1729 = 7 × 13 × 19
13 – 7 = 6
19 – 13 = 6
Hence, the difference between two consecutive prime factors is 6.

7. The product of three consecutive numbers is always divisible by 6. Verify this statement with the help of some examples.
Solutions:
(i) 2 × 3 × 4 = 24 which is divisible by 6
(ii) 5 × 6 × 7 = 210 which is divisible by 6

8. The sum of two consecutive odd numbers is divisible by 4. Verify this statement with the help of some examples.
Solutions:
(i) 5 + 3 = 8 which is divisible by 4
(ii) 7 + 9 = 16 which is divisible by 4
(iii) 13 + 15 = 28 which is divisible by 4

9. In which of the following expressions, prime factorisation has been done?
(a) 24 = 2 × 3 × 4
(b) 56 = 7 × 2 × 2 × 2

(c) 70 = 2 × 5 × 7
(d) 54 = 2 × 3 × 9
Solutions:
(a) 24 = 2 × 3 × 4
Since, 4 is composite. Hence, prime factorisation has not been done
(b) 56 = 7 × 2 × 2 × 2
Since, all the factors are prime. Hence, prime factorisation has been done
(c) 70 = 2 × 5 × 7
Since, all the factors are prime. Hence, prime factorisation has been done
(d) 54 = 2 × 3 × 9
Since, 9 is composite. Hence prime factorisation has not been done

10. Determine if 25110 is divisible by 45. [Hint: 5 and 9 are co-prime numbers. Test the divisibility of the number by 5 and 9].
Solutions:
45 = 5 × 9
1, 5 are factors of 5
1, 3, 9 are factors of 9
Hence, 5 and 9 are co-prime numbers
The last digit of 25110 is 0. Hence, it is divisible by 5
Sum of digits 25110
2 + 5 + 1 + 1 + 0
= 9
Since, the sum of digits of 25110 is divisible by 9. Hence, 25110 is divisible by 9
Since the number is divisible by both 5 and 9
Therefore 25110 is divisible by 45

11. 18 is divisible by both 2 and 3. It is also divisible by 2 × 3 = 6. Similarly, a number is divisible by both 4 and 6. Can we say that the number must also be divisible by 4 × 6 = 24? If not, give an example to justify your answer.
Solutions:
No, since, 12 and 36 are both divisible by 4 and 6. But 12 and 36 are not divisible by 24

12. I am the smallest number, having four different prime factors. Can you find me?
Solutions:
Since, it is the smallest number. Therefore it will be the product of 4 smallest prime numbers
2 × 3 × 5 × 7 = 210