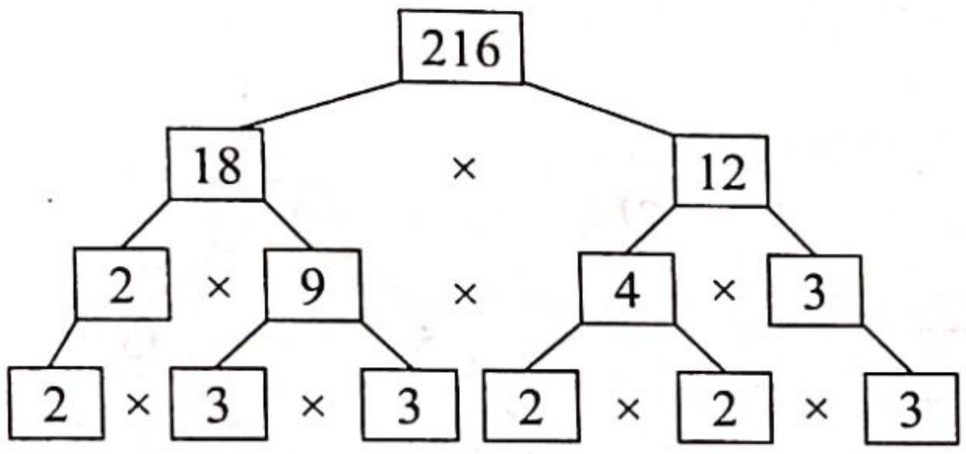
Chapter 4: Factors and Multiples

Warm-up

1. Factors of 16 are 1, 2, 4, 8, 16 – Prime factor is 2.
2. 6, 12, 18, 24, 30 – Multiples of 6.

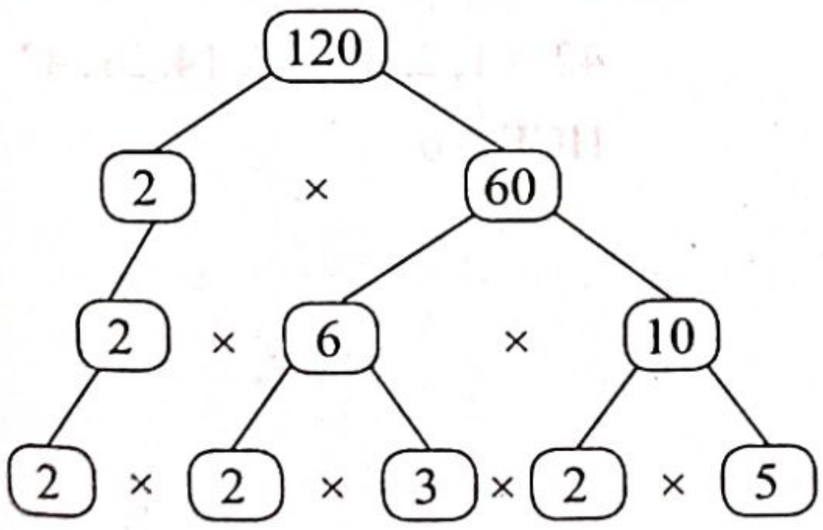
   2, 5, 7 – Prime factors. 1, 2, 3, 4, 6, 12, 24 factors of 24.
3. 

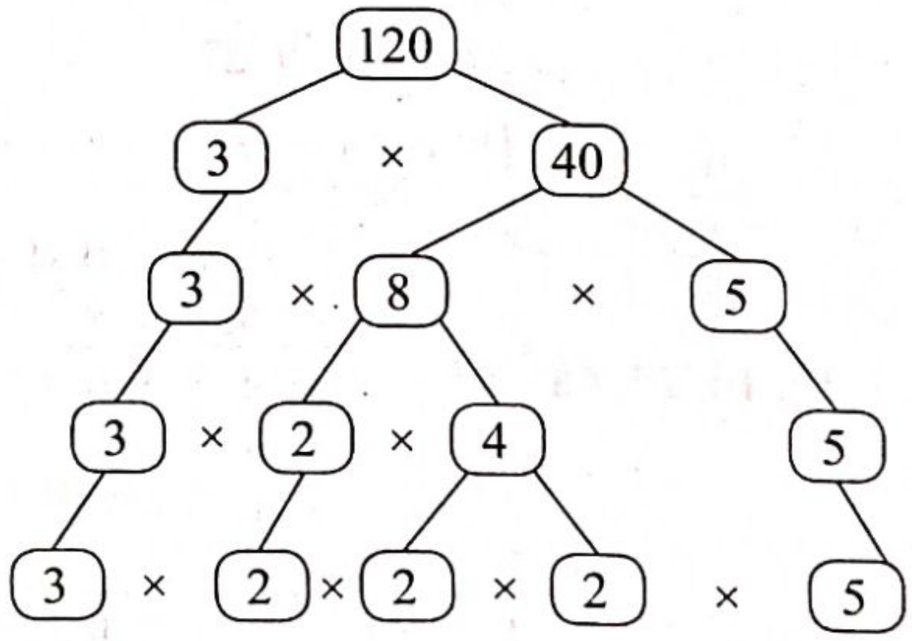
Class Work (Pg 54)

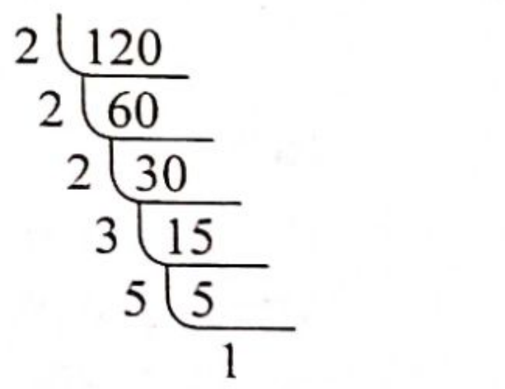
1. Factors of 54 = 1, 2, 3, 6, 9, 18, 27, 54.
2. (a) Prime numbers – 7, 11, 23, 31, 37, 43.

   (b) Co-primes – (4, 9), (4, 7), (9, 25), (25, 42), (31, 37). (Answars may vary)

Class Work (Pg 56)







Class Work (Pg 57)

1. Factors of 20 = 1, 2, 4, 5, 10, 20
   Factors of 28 = 1, 2, 4, 7, 14, 28
   HCF = 4

2. Factors of 12 = 1, 2, 3, 4, 6, 12
   Factors of 30 = 1, 2, 3, 5, 6, 10, 15, 30
   HCF = 6

3. $3\overline{)27}$ $3\overline{)9}$ $3\overline{)3}$ 1 — $27 = 3 \times 3 \times 3$
   $3\overline{)45}$ $3\overline{)15}$ $5\overline{)5}$ 1 — $45 = 3 \times 3 \times 5$
   HCF = $3 \times 3 = 9$

4. $2\overline{)18, 42, 48}$
   $3\overline{)9, 21, 24}$
   3, 7, 8
   HCF = $2 \times 3 = 6$

Class Work (Pg 59)

1. $217\overline{)686}(3$
   -651
   $35)217(6$
   -210
   $7)35(5$
   35
   $\times$
   HCF = 7

2. $320\overline{)736}(2$
   -640
   $96)320(3$
   -288
   $32)96(3$
   96
   $\times$
   HCF = 32

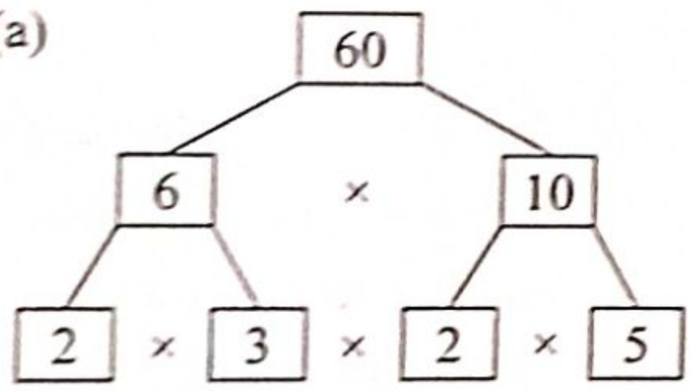
3. $450\overline{)675}(1$
   -450
   $225)450(2$
   -450
   $\times$
   HCF = 225

4. $225\overline{)825}(3$
   -675
   $150)225(1$
   -150
   $75)150(2$
   150
   $\times$
   HCF = 75

Exercise 4A

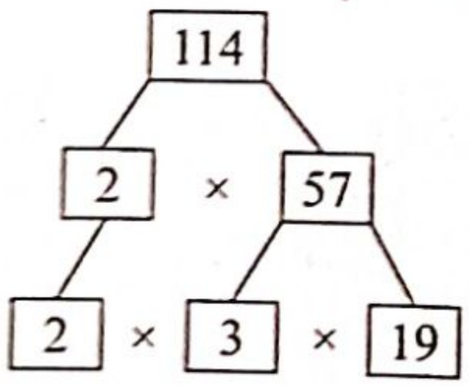
1. (a) 11 = 1, 11 Prime
   (b) 32 = 1, 2, 4, 8, 16, 32 Composite
   (c) 40 = 1, 2, 4, 5, 8, 10, 20, 40 Composite
   (d) 19 = 1, 19 Prime
   (e) 66 = 1, 2, 3, 6, 11, 22, 33, 66 Composite
   (f) 153 = 1, 3, 9, 17, 51, 153 Composite

2. (a)



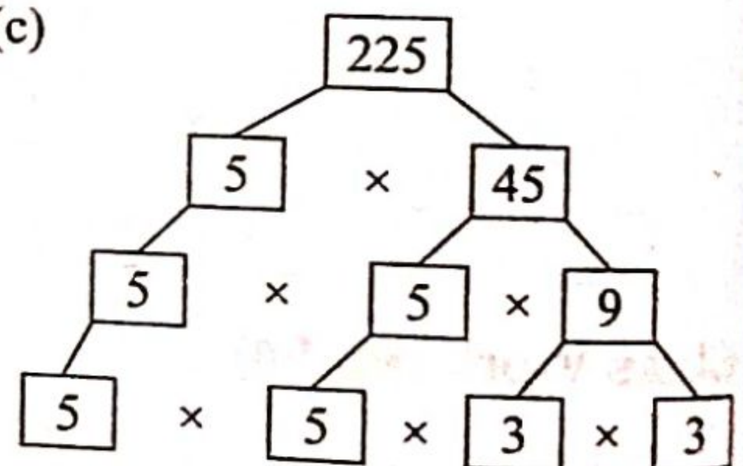
$60 = 2 \times 2 \times 3 \times 5$

(b)



$114 = 2 \times 3 \times 19$

(c)



$225 = 3 \times 3 \times 5 \times 5$

3. (a) $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$
   (b) $150 = 2 \times 3 \times 5 \times 5$
   (c) $84 = 2 \times 2 \times 3 \times 7$
   (d) $1080 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$

4. (a) 15 = 1, 3, 5, 15
   35 = 1, 5, 7, 35
   HCF = 5

   (b) 16 = 1, 2, 4, 8, 16
   27 = 1, 3, 9, 27
   HCF = 1

   (c) 30 = 1, 2, 3, 5, 6, 10, 15, 30
   42 = 1, 2, 3, 6, 7, 14, 21, 42
   HCF = 6

   (d) 18 = 1, 2, 3, 6, 9, 18
   32 = 1, 2, 4, 8, 16, 32
   48 = 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
   HCF = 2

5. (a)
$2\overline{)36}$, $2\overline{)18}$, $3\overline{)9}$, $3\overline{)3}$, 1

$36 = 2 \times 2 \times 3 \times 3$

$2\overline{)60}$, $2\overline{)30}$, $3\overline{)15}$, $5\overline{)5}$, 1

$60 = 2 \times 2 \times 3 \times 5$

HCF $= 2 \times 2 \times 3 = 12$

(b)
$2\overline{)18}$, $3\overline{)9}$, $3\overline{)3}$, 1

$18 = 2 \times 3 \times 3$

$2\overline{)24}$, $2\overline{)12}$, $2\overline{)6}$, $3\overline{)3}$, 1

$24 = 2 \times 2 \times 2 \times 3$

$2\overline{)42}$, $3\overline{)21}$, $7\overline{)7}$, 1

$42 = 2 \times 3 \times 7$

HCF $= 2 \times 3 = 6$

(c)
$2\overline{)36}$, $2\overline{)18}$, $3\overline{)9}$, $3\overline{)3}$, 1

$36 = 2 \times 2 \times 3 \times 3$

$2\overline{)48}$, $2\overline{)24}$, $2\overline{)12}$, $2\overline{)6}$, $3\overline{)3}$, 1

$48 = 2 \times 2 \times 2 \times 2 \times 3$

$2\overline{)60}$, $2\overline{)30}$, $3\overline{)15}$, $5\overline{)5}$, 1

$60 = 2 \times 2 \times 3 \times 5$

HCF $= 2 \times 2 \times 3 = 12$

(d)
$2\overline{)28}$, $2\overline{)14}$, $7\overline{)7}$, 1

$28 = 2 \times 2 \times 7$

$2\overline{)42}$, $3\overline{)21}$, $7\overline{)7}$, 1

$42 = 2 \times 3 \times 7$

$2\overline{)56}$, $2\overline{)28}$, $2\overline{)14}$, $7\overline{)7}$, 1

$56 = 2 \times 2 \times 2 \times 7$

HCF $= 2 \times 7 = 14$

6. (a)
$128\overline{)192}(1$, -128, $64\overline{)128}(2$, -128, $\times$

HCF $= 64$

(b)
$145\overline{)325}(2$, -290, $35\overline{)145}(4$, -140, $5\overline{)35}(7$, -35, $\times$

HCF $= 5$

(c)
$495\overline{)945}(1$, -495, $450\overline{)495}(1$, -450, $45\overline{)450}(10$, 450, $\times$

HCF $= 45$

7. (c) HCF of 36, 54, 63 = 9

8. (b) Required number = (245 – 5 = 240) and (1029 – 5 = 1024). Now HCF of 240 and 1024 = 16.

Challenge!

1. (a) Consecutive natural numbers 1, 2, 3, ..., HCF = 1

(b) Consecutive even numbers 2, 4, 6, ..., HCF = 2

(c) Consecutive odd numbers 1, 3, 5, ..., HCF = 1

Class Work (Pg 62)

1. 9 = 9, 18, 27, 36, 45

12 = 12, 24, 36, 48

LCM = 36

2. $15 = 3 \times 5$

$48 = 2 \times 2 \times 2 \times 2 \times 3$

LCM $= 3 \times 2 \times 2 \times 2 \times 2 \times 5 = 240$

3.
$2\overline{)18, 42, 48}$
$3\overline{)9, 21, 24}$
$2\overline{)3, 7, 8}$
$2\overline{)3, 7, 4}$
3, 7, 2

LCM $= 2 \times 3 \times 2 \times 2 \times 3 \times 7 \times 2 = 1008$

4.
$5\overline{)15, 25, 30}$
$3\overline{)3, 5, 6}$
1, 5, 2

LCM $= 5 \times 3 \times 5 \times 2 = 150$

Exercise 4B

1. (a) 9 : 9, 18, 27, 36, 45, 54
   (b) 13 : 13, 26, 39, 52, 65, 78
   (c) 18 : 18, 36, 54, 72, 90, 108

2. (a) 8 = 8, 16, 24, 32, 40, 48, 56
   14 = 14, 28, 42, 56
   LCM = 56

   (b) 12 = 12, 24, 36, 48, 60, 72
   18 = 18, 36, 54, 72
   LCM = 36

   (c) 10 = 10, 20, 30, 40, 50, 60
   15 = 15, 30, 45, 60
   LCM = 30

   (d) 6 = 6, 12, 18, 24, 30, 36, 42, 48
   16 = 16, 32, 48, 64
   LCM = 48

3. (a)
   2 | 24
   2 | 12
   2 | 6
   3 | 3
   1

   2 | 32
   2 | 16
   2 | 8
   2 | 4
   2 | 2
   1

   $24 = 2 \times 2 \times 2 \times 3$
   $32 = 2 \times 2 \times 2 \times 2 \times 2$
   $LCM = 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 96$

   (b)
   2 | 56
   2 | 28
   2 | 14
   7 | 7
   1

   2 | 32
   2 | 16
   2 | 8
   2 | 4
   2 | 2
   1

   $56 = 2 \times 2 \times 2 \times 7$
   $32 = 2 \times 2 \times 2 \times 2 \times 2$
   $LCM = 2 \times 2 \times 2 \times 2 \times 7 \times 2 = 224$

   (c)
   3 | 15
   5 | 5
   1

   2 | 18
   3 | 9
   3 | 3
   1

   2 | 30
   3 | 15
   5 | 5
   1

   $15 = 3 \times 5$
   $18 = 2 \times 3 \times 3$
   $30 = 2 \times 3 \times 5$
   $LCM = 2 \times 3 \times 3 \times 5 = 90$

   (d)
   2 | 30
   3 | 15
   5 | 5
   1

   2 | 40
   2 | 20
   2 | 10
   5 | 5
   1

   2 | 60
   2 | 30
   3 | 15
   5 | 5
   1

   $30 = 2 \times 3 \times 5$
   $40 = 2 \times 2 \times 2 \times 5$
   $60 = 2 \times 2 \times 3 \times 5$
   $LCM = 2 \times 2 \times 2 \times 3 \times 5 = 120$

4. (a)
   2 | 4, 12, 20
   2 | 2, 6, 10
   3 | 1, 3, 5
   5 | 1, 1, 5
   1, 1, 1

   $LCM = 2 \times 2 \times 3 \times 5 = 60$

   (b)
   2 | 16, 28, 44
   2 | 8, 14, 22
   2 | 4, 7, 11
   2, 7, 11

   $LCM = 2 \times 2 \times 2 \times 2 \times 7 \times 11 = 1232$

   (c)
   3 | 39, 45, 54
   3 | 13, 15, 18
   2 | 13, 5, 6
   13, 5, 3

   $LCM = 3 \times 3 \times 2 \times 13 \times 5 \times 3 = 3510$

   (d)
   5 | 25, 40, 60, 120
   2 | 5, 8, 12, 24
   2 | 5, 4, 6, 12
   2 | 5, 2, 3, 6
   3 | 5, 1, 3, 3
   5, 1, 1, 1

   $LCM = 5 \times 2 \times 2 \times 2 \times 3 \times 5 = 600$

5. (a) LCM of 6, 7, 8, 9 = 504 s

6. (c) LCM of 2 prime numbers = their product

Exercise 4C

1. (a) 5695 – Ones digit is 5, so it is divisible by 5.

   (b) 32900 – Ones digit is 0, so it is divisible by 10.

   (c) 3979 – Sum of digits $3 + 9 + 7 + 9 = 28$, which is not divisible by 3. So, the number is not divisible by 3.

   (d) 4236 – Ones digit is 6, so it is divisible by 2. Sum of digits $4 + 2 + 3 + 6 = 15$, which is divisible by 3. So, the number is also divisible by 3. Thus, the number is divisible by 6 too.

   (e) 12345 – Sum of digits $1 + 2 + 3 + 4 + 5 = 15$, which is divisible by 3. So, the number is also divisible by 3.

   (f) 68709 – Sum of digits $6 + 8 + 7 + 0 + 9 = 30$, which is not divisible by 9. So, the number is not divisible by 9.

   (g) 13416 – The number formed by last two digits 16 is divisible by 4. So, the number is also divisible by 4.

   (h) 100008 – Sum of digits = 9, which is divisible by 9. So, the number is divisible by 9.

2. (a) 18864 – The number formed by last two digits is 64, so it is divisible by 4. Sum of digits $1 + 8 + 8 + 6 + 4 = 27$, which is divisible by 9. So, the number is also divisible by 9. Since the number 18864 is divisible by both 4 and 9, it is divisible by 36 too.

   (b) 6744 – The number formed by last two digits is 44, so it is divisible by 4. Sum of digits $6 + 7 + 4 + 4 = 21$, which is divisible by 3. So, the number is also divisible by 3. Since the number 6744 is divisible by both 4 and 3, it is also divisible by 12.

   (c) 3540 – Sum of digits $3 + 5 + 4 + 0 = 12$, which is divisible by 3. So, the number is divisible by 3. Ones digit is 0, so it is divisible by 5. Since the number 3540 is divisible by both 3 and 5, it is also divisible by 15.

   (d) 4000 – Ones digit is 0, so it is divisible by 10. Sum of digits $4 + 0 + 0 + 0 = 4$, which is not divisible by 3. So, the number is not divisible by 3. Thus, the number 4000 is not divisible by 30.

3. (a) Box A – 270 pencils is divisible by 2, 3, 5, 6, 9 and 10.

   (b) Box A and B – 270 and 255 pencils divisible by 5 and 3.

4. 170 – Ones digit is 0, so it is divisible by 5. Sum of digits $1 + 7 + 0 = 8$, which is not divisible by 3. So, the number is not divisible by 3. Thus, the number 170 is not divisible by 15.

5. (a) $1947 = 1 + 9 + 4 + 7 = 21$ divisible by 3

Mental Maths

1. Prime numbers between 30 and 40 = 31, 37

2. Least prime even number = 2,

3. $70 = 2 \times 5 \times 7$

4. $12\overline{)18}(1$
   -12
   $\overline{6)12(2}$
   -12
   $\times$

   HCF = 6

5. $5\overline{)5, 25}$
   $5\overline{)1, 5}$
   $1, 1$

   LCM = $5 \times 5 = 25$

Chapter Test

1. (a) The two numbers which have only 1 as their common factor are called co-primes.

   (b) The smallest multiple of a number is the number itself.

(c) 36 as a sum of two prime numbers is $\underline{17 + 19}$.

(d) The LCM of 12 and 7 is $\underline{84}$.

(e) The prime factorisation of $160 = 2 \times 2 \times 2 \times 2 \times 2 \times 5$

2. (a) An example of twin primes is 7 and 9 – $\underline{\text{False}}$.

(b) Every number is a factor and a multiple of itself – $\underline{\text{True}}$.

(c) HCF of two co-prime numbers is the smaller number – $\underline{\text{False}}$.

(d) LCM of 5 and 7 is 35 – $\underline{\text{True}}$

(e) 4410 is divisible by 45 – $\underline{\text{True}}$

3. Sum = 13 + 37 + 43 = 93. Not a prime number.

4. (a)

$$\begin{array}{r} 56\overline{)\ 72\ (1} \\ -56 \\ \hline 16\ )\ 56\ (3 \\ -48 \\ \hline 8)\ 16(2 \\ -16 \\ \times \end{array}$$

HCF = 4

$$\begin{array}{r} 8\overline{)\ 140(17} \\ -8 \\ \hline 60 \\ -56 \\ \hline 4)8(2 \\ 8 \\ \times \end{array}$$

(b)

$$\begin{array}{l} 2\overline{)\ 18, 36, 40, 60} \\ 2\overline{)\ 9, 18, 20, 30} \\ 3\overline{)\ 9, 9, 10, 15} \\ 3\overline{)\ 3, 3, 10, 5} \\ 5\overline{)\ 1, 1, 10, 5} \\ \quad 1, 1, 2, 1 \end{array}$$

LCM = 2 × 2 × 2 × 3 × 3 × 5 = 360

5. 65490 divisible by 2, 3, 5, 6, 10, 15

6. (d) **7.** (a) **8.** (c) **9.** (a)

10. (d) (HCF of 75, and 90 = 15 m)

Challenge!

1. Number of apples to be packed = LCM of 16, 30 and 40

2. (a) Odd composite number more than 50, divisible by 3, 17 and 4 less than a multiple of 5 and

$11 = 55 - 4 = 51$.

$$\begin{array}{l} 2\overline{)\ 16, 30, 40} \\ 2\overline{)\ 8, 15, 20} \\ 2\overline{)\ 4, 15, 10} \\ 5\overline{)\ 2, 15, 5} \\ \quad 2, 3, 1 \end{array}$$

LCM = 2 × 2 × 2 × 2 × 5 × 3 = 240 apples

(b) An even, 2-digit palindromic number, 7 more than the square of a number and sum of the digits is

$16 = 81 + 7 = 88$

(c) Odd 3-digit number product of digits is 1 and 6th consecutive number after $99 = 99 + 2 \times 6$

$= 99 + 12 = 111$

3. 46 = 17 + 29 (Sum of 2 primes)

Worksheet

1. (d) **2.** (a) **3.** (c) **4.** (b)