## Solution

## Class 10 - Mathematics

## Real Numbers

### Section A

1. **(b)** co-prime numbers
**Explanation:** If two numbers do not have a common factor (other than 1), then they are called co-primer numbers. We know that two numbers are coprime if their common factor (greatest common divisor) is 1. e.g. co-prime of 12 are 11, 13.
2. **(d)** $\frac{15}{16}$
**Explanation:** We have, $\frac{1095}{1168}$ = $\frac{3\times5\times73}{2^4\times73}$ =$\frac{15}{16}$
Hence, HCF of 1095 and 1168 is 73
3. **(b)** 2 or 5 only
**Explanation:** A rational number can be expressed as a terminating decimal if the denominator has the factors 2 or 5 or both. Any other factors in the denominator yield a non-terminating decimal expansion.
4. **(b)** two decimal places
**Explanation:** Number = $\frac{33}{2^2\times5} = \frac{66}{2^2\times5^2} = \frac{66}{100}$
Clearly, it terminates after two decimal places.
5. **(c)** 2
**Explanation:** First, find the HCF of 65 and 117
117 = 65 $\times$ 1 + 52
65 = 52 $\times$ 1 + 13
52 = 13 $\times$ 4 + 0 (zero remainder)
Therefore, HCF (117 , 65) is 13
Now,
$\therefore$ 65m – 117 = 13
$\Rightarrow$ 65m = 13 + 117
$\Rightarrow$ 65m = 130
$\Rightarrow$ m = 2
6. **(d)** $\frac{77}{210}$
**Explanation:** $\frac{77}{210}$ = $\frac{11}{30} = \frac{11}{2\times3\times5}$
Because non-terminating repeating decimal expansion should have the denominator other than 2 or 5.
7. **(a)** $\frac{17}{6}$
**Explanation:** $\frac{17}{6}$ has a non-terminal repeating decimal expansion.
$\frac{17}{6}$ = 2.6333...
8. **(a)** equal
**Explanation:** If we assume that a and b are equal and consider a = b = k
Then,
HCF (a, b)= k
LCM (a, b) = k
9. **(d)** Irrational
**Explanation:** $\sqrt{p}$ is an irrational number because the square root of every prime number is an irrational number. (for example $\sqrt{3}$ is an irrational number)
10. **(b)** 81
**Explanation:** Let the two numbers be x and y.
It is given that:
x = 54
HCF = 27

LCM = 162
We know,
x × y = HCF × LCM
⇒ 54 × y = 27 × 162
⇒ 54y = 4374
⇒ $\therefore y = \frac{4374}{54} = 81$

11. **(b)** $2^3 \times 3^3$

    **Explanation:** L.C.M. of $2^3 \times 3^2$ and $2^2 \times 3^3$ is the product of all prime numbers with the greatest power of every given number, hence it will be $2^3 \times 3^3$

12. **(a)** a rational number

    **Explanation:** $1.23\overline{48}$ can be written in the form $\frac{p}{q}$ so it is a rational number.

13. **(c)** 2

    **Explanation:** Since 5 + 3 = 8, the least prime factor of a + b has to be 2, unless a + b is a prime number greater than 2.
    If a + b is a prime number greater than 2, then a + b must be an odd number. So, either a or b must be an even number. If a is even, then the least prime factor of a is 2, which is not 3 or 5. So, neither a nor b can be an even number. Hence, a + b cannot be a prime number greater than 2 if the least prime factor of a is 3 or 5.

14. Here:
    $a = x^3y^2$, and $b = xy^3$
    LCM = Product of highest powers of x and y
    so, LCM = $x^3y^3$
15. Given that a = 14b......(1)
    By Euclid's division lemma we Know that
    $\mathrm{p} = \mathrm{mq} + \mathrm{r}$ where $0 \leq \mathrm{r} < \mathrm{q}$.......(2)
    From (1) and (2) p=a,q=b ,m=14 and r= 0
    So equation(1) can be written as:
    a = 14 ×b + 0
    Here remainder is 0
    ∴ HCF (a,b) = b
16. 1376 = $2 \times 2 \times 2 \times 2 \times 2 \times 43$= $2^5 \times 43$
    15428 = $2 \times 2 \times 7 \times 19 \times 29$= $2^2 \times 7 \times 19 \times 29$
    HCF = $2^2$ = 4
    LCM = $2^5 \times 43 \times 7 \times 19 \times 29$= 530 7232
17. We have, $\frac{6}{15} = \frac{2\times3}{3\times5} = \frac{2}{5}$
    Here denominator (q) = $2^0 \times 5^1$, The denominator is in the form of $2^n \times 5^m$, where n = 0 and m = 1
    Hence, the decimal expansion of $\frac{6}{15}$ is terminating.
18. In such case we first find HCF of 66,88,and 110.
    So ,66 = 2×3×11; 88 = 2×2×2×11; 110 = 2×5×11
    Therefore, HCF of 66, 88 and 110 = 2×11=22
    Therefore number of trees in each row = 22
    Hence number of rows = $\frac{66}{22} + \frac{88}{22} + \frac{110}{22}$
    = 3 + 4 + 5
    = 12.
    Thus number of minimum rows required is equal to 12.
19. 3825 = 3 × 3 × 5 × 5 × 17 = $3^2 \times 5^2 \times 17$
20. Since the decimal expansion is non-terminating but recurring, the given number is a rational number of the form $\frac{p}{q}$ and q is not of the form $2^m \times 5^n$ that is, the prime factors of q will also have a factor other than 2 and 5.

21. Yes, The denominator can be expressed as $5^3 2^2$ and this is of the type $2^m.5^n$ so, this is terminating decimal. $\left(\because \frac{987}{10500} = \frac{47}{500} = \frac{47}{5^3 2^2}\right)$
22. Prime factorization:

    360 = $2^3 \times 3^2 \times 5$
23. Factorize the denominator we get,

    30 = $2 \times 3 \times 5$

    Since the denominator is not in the form of $2^m \times 5^n$, as it has 3 in denominator.

    So, the decimal expansion of $\frac{77}{210}$ is non-terminating repeating.
24. Prime factors of 473 and 645

    $473 = 11 \times 43$

    $645 = 3 \times 5 \times 43$

    $\frac{473}{645} = \frac{11 \times 43}{3 \times 5 \times 43} = \frac{11}{15}$
25. We have

    7 m = 700 cm

    3 m 85 cm = 385 cm

    12 m 95 cm = 1295 cm

    Now prime factors of 700, 385 and 1295 are

    $700 = 2^2 \times 5^2 \times 7$

    $385 = 5 \times 7 \times 11$

    $1295 = 5 \times 7 \times 37$

    HCF of 700,385 and 1295 = $5 \times 7$ = 35.

    So to measure exactly, the greatest length we can use is 35 cm.
26. 1000 = $2 \times 2 \times 2 \times 5 \times 5 \times 5$

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

    HCF of 1000 and 56 = 8

    $\therefore$ Maximum number of columns = 8

**Section B**

27. i. (b) HCF
    ii. (a) 3360
    iii. (c) 2, 5, 7
    iv. (b) x = 21; y = 84
    v. (a) $xy^2$

**Section C**

28. State True or False:

    a) **(a)** True
    **Explanation:** True

    b) **(a)** True
    **Explanation:** True

    c) **(b)** False
    **Explanation:** False. The product of two irrational numbers, in some cases, will be irrational. However, it is possible that some irrational numbers may multiply to form a rational product.
    $\sqrt{5} \times \sqrt{2} = \sqrt{10}$ which is irrational
    $\sqrt{8} \times \sqrt{2} = \sqrt{16} = 4$ which is rational

    d) **(b)** False
    **Explanation:** False. As we know that every prime is odd except 2. Also when two odd numbers are added up, the result will be an even number which is never prime. So the only time when 2 prime numbers add to get a prime number is when the two numbers are 2 and 3.

    e) **(b)** False
    **Explanation:** False. The sum of two irrational numbers, in some cases, will be irrational. However, if the irrational parts of the numbers have a zero sum (cancel each other out), the sum will be rational.

$4\sqrt{5}+3\sqrt{2}=4\sqrt{5}+3\sqrt{2}$ which is irrational.
$(2+6\sqrt{7})+(-6\sqrt{7})=2$ which is rational

29. Fill in the blanks:

a) 1. 2

b) 1. 12

c) 1. product

d) 1. Product

e) 1. 4