KEY

CHAPTER - 1

Real Numbers

Similar Practice Questions :

Exercise – 1.1

1. i) 90 ii) 197 iii) 254

Exercise –1.2

1. i) $2^3 \times 3^4$ ii) $3^3 \times 2^5$ iii) $2 \times 3^3 \times 5^2$
   iv) $2 \times 3^2 \times 7^2$ v) $2^3 \times 11 \times 13$
2. i) LCM = 1260; HCF = 2
   ii) LCM = 5681; HCF = 1
   iii) LCM = 432 : HCF = 6
   iv) LCM = 3360, HCF = 2
3. Hint : A composite number can be factorised as the product of primes.
4. Hint : A composite number can be factorised as the product of primes.

Exercise –1.3

1. i) terminating
   ii) non-terminating, repeating
   iii) non-terminating, repeating
   iv) terminating
2. i) terminating
   ii) terminating
   iii) non - terminating
   iv) non-terminating, repeating
3. i) 0.68 ii) 0.31
   iii) 2.850777 iv) 1.218181...

Exercise –1.4

1. Try yourself
2. Try yourself

Exercise –1.5

1. (i) $\log_4 1024 = 5$ (ii) $\log_3 6561 = 8$
   (iii) $\log_{10} 10000 = 4$ (iv) $\log_{10} 0.00001 = -5$
   (v) $\log_m{}^1 = 0$ (vi) $\log_3\left(\frac{1}{9}\right) = -2$
2. (i) $10^3 = 1000$ (ii) $8^{-1} = 0.125$
   (iii) $10^{-2} = 0.01$ (iv) $(0.05)^{-4} = 16$
   (v) $5^3 = 125$ vi) $5^\circ = 1$
3. i) 7/2 ii) –8 iii) 2
   iv) 3 v) 4 vi) –2
4. i) $\log \frac{8}{9}$ ii) log 10 = 1
   iii) log 36 iv) $\log \frac{9}{2}$
   v) $\log\left(\frac{x^2}{y^3z^4}\right)$ vi) log1 = 0
5. i) $\frac{3}{2}$ log a+5 log b + 8 log c
   ii) log 133 – log 65 iii) 3 log x + 4 y – log 3
   iv) z log P – $\frac{3}{2}$ log q v) log 5 + 2log 10

Creative zone :

Exercise - 1.1

I. 1. Theorem : Euclids Division Lemma

a = bq + r, q > 0 and $0 \le r < b$

i) 800 and 240

When 800 is divided by 240, then the remainder is 80 to get

$800 = 240 \times 3 + 80$

Now consider the division of 240 with the remainder 80. In the above and division algorithm to get

$240 = 80 \times 3 + 0$

Then the remainder is zero. When we cannot proceed further. We conclude that the

HCF of (800, 240) = 80

ii) 184 and 34960

When 34960 is divided by 184, then remainder is zero to get

$34960 = 184 \times 190 + 0$

The remainder is zero. When we can not proceed further, we conclude that the

HCF of (184, 34960) = 184

Exercise - 1.2

2. **HCF** : Product of the smallest power of each common prime factors in the numbers.

LCM : Product of the greatest power of each prime factor in the numbers.

i) 20, 35 and 45

$20 = 5 \times 4 = 5 \times 2^2$

$35 = 5 \times 7$

$45 = 5 \times 9 = 5 \times 3^2$

HCF = 5

$LCM = 5 \times 2^2 \times 7 \times 3^2 = 1260$

ii) 13, 19 and 29

$13 = 1 \times 13$

$19 = 1 \times 19$

$29 = 1 \times 29$

HCF = 1

LCM = $13 \times 19 \times 29 = 7163$

iii) 168 and 216

$168 = 2 \times 84$

$= 2 \times 2 \times 42 = 2^2 \times 2 \times 21$

$= 2^3 \times 3 \times 7$

$216 = 2 \times 108$

$= 2 \times 2 \times 54$

$= 2^2 \times 2 \times 27$

$= 2^3 \times 3^3$

HCF = $2^3 \times 3 = 24$

LCM = $2^3 \times 3^3 \times 7 = 1512$

iv) 468 and 612

$468 = 2 \times 234$

$= 2 \times 2 \times 117$

$= 2^2 \times 3 \times 39$

$= 2^2 \times 3 \times 3 \times 13$

$= 2^2 \times 3^2 \times 13$

$612 = 2 \times 306$

$= 2 \times 2 \times 153$

$= 2^2 \times 3 \times\times 51$

$= 2^2 \times 3 \times 3 \times 17$

$= 2^2 \times 3^2 \times 17$

HCF = $2^2 \times 3^2 = 36$

LCM = $2^2 \times 3^2 \times 13 \times 17 = 7956$

Exercise - 1.3

3. i) $\mathbf{\frac{7}{8}}$

$\frac{7}{8} = \frac{7}{2.2.2} = \frac{7}{2^3}$ is a terminating decimal.

∵ Denominator consists of only 2's

$\frac{7}{2^3} = \frac{7 \times 5^3}{2^3 \times 5^3} = \frac{875}{10^3} = \frac{875}{1000} = 0.875$

ii) $\mathbf{\frac{13}{200}}$

$\frac{13}{200} = \frac{13}{2.2.2.5.5} = \frac{13}{2^3 \times 5^2}$ is a terminating decimal.

∵ Denominator consists of only 2's and 5's

$\frac{13}{2^3 \times 5^2} = \frac{13 \times 5}{2^3 \times 5^2 \times 5} = \frac{13 \times 5}{2^3 \times 5^3} = \frac{65}{10^3}$

$= \frac{65}{1000} = 0.065$

iii) $\mathbf{\frac{31}{125}}$

$\frac{31}{125} = \frac{31}{5^3}$ is terminating decimal.

∵ Denominator consists of only 5's

iv) $\mathbf{\frac{5}{11}}$

$\frac{5}{11}$ is a non-terminating, repeating decimal.

∵ Denominator does not contain 2's or 5's or both.

Exercise - 1.4

4. **i) log (400)**

∵ log (x × y) = log x + log y

log (400) = log (16 × 25)

= log 16 + log 25

$= \log 2^4 + \log 5^2$

$= 4 \log 2 + 2 \log 5$

ii) $\left(\mathbf{\frac{216}{125}}\right)$ ∵ $\log\left(\frac{x}{y}\right) = \log x - \log y$

$\log\left(\frac{216}{125}\right) = \log 216 - \log 125$

$= \log 6^3 - \log 5^3$

$= 3 \log 6 - 3 \log 5$

$= 3 [\log 6 - \log 5]$

iii) log $(x^2y^4z^3)$

$\log (x^2 y^4 z^3) = \log x^2 + \log y^4 + \log z^3$

$= 2 \log x + 4 \log y + 3 \log z$

iv) log $\left(\mathbf{\frac{p^2q^3}{r^2}}\right)$ ∵ $\log\left(\frac{x}{y}\right) = \log x - \log y$

$\log\left(\frac{p^2q^3}{r^2}\right) = \log (p^2q^3) - \log r^2$

$= \log p^2 + \log q^3 - \log r^2$

(∵ $\log a^m = m \log a$)

v) $\log\sqrt{\frac{x^3}{y^5}}$

$\log\sqrt{\frac{x^3}{y^5}} = \log\left(\frac{x^3}{y^5}\right)^{\frac{1}{2}}$ ($\because$ log a^m = m log a)

$= \frac{1}{2}\log\left(\frac{x^3}{y^5}\right)$ $\because$ $\log\left(\frac{x}{y}\right)$

= log x – log y

$= \frac{1}{2}$(log x^3 – log ^{5})

$= \frac{1}{2}$(3 log x – 5 log y)

Exercise - 1.5

5. Let us assume to the contrary that

$\sqrt{a} - \sqrt{b}$ is rational

$\sqrt{a} - \sqrt{b} = \frac{p}{q}$

$\sqrt{a} = \frac{p}{q} + \sqrt{b}$

squaring on both sides

$\left(\sqrt{a}\right)^2 = \left(\frac{p}{q} + \sqrt{b}\right)^2$

$a = \frac{p^2}{q^2} + \frac{2p}{q}\sqrt{b} + b$

$a = \frac{p^2}{q^2} + b + \frac{2p}{q}\sqrt{b}$

$-2\frac{p}{q}\sqrt{b} = \frac{p^2}{q^2} + \frac{b}{1} - \frac{a}{1} = \frac{p^2 + bq^2 - aq^2}{q^2} = \frac{p^2 + q^2(b-a)}{q^2}$

$\frac{-2}{1}\frac{p}{q}\sqrt{b} = \frac{p^2 + q^2(b-a)}{q^2}$

$\sqrt{b} = \frac{p^2 + q^2(b-a)}{q^2}\left(-\frac{q}{2p}\right)$

$\sqrt{b} = -\frac{q}{2p}\left(\frac{p^2 + q^2(b-a)}{q^2}\right)$

$\sqrt{b} = -\frac{p^2 + q^2(b-a)}{2pq}$

We know that square root of any prime number is irrational we get $\sqrt{a}$ is rational.

This contradicts the fact that $\sqrt{b}$ is irrational.

So our assumption is wrong.

$\sqrt{b}$ is irrational

So, $\sqrt{a} - \sqrt{b}$ is irrational.

II.

1) C	2) B	3) D	4) A	5) B
6) C	7) B	8) A	9) B	10) B
11) B	12) C	13) B	14) D	15) A
16) B	17) D	18) A	19) C	20) D

CHAPTER - 2

Sets

Similar Practice Questions :

Exercise – 2.1

1. (i) & (iii) are sets
2. 3 $\notin$ A; 4 $\in$ A; 2 $\in$ B; 7 $\in$ B;
   10 $\in$ B; and 1 $\in$ A
3. y $\notin$ A; C $\in$ B; 2 $\in$ N; 9 $\notin$ P
4. (i) A = {–4, 4} (ii) B = ϕ
   (iii) C = {C, A, L, U, S}
   (iv) D = {– 2, –1, 0, 1, 2, 3, 4, 5}
5. (i) A = {x : x is a natural number multiple of 3 and x = 1}
   (ii) B = {x : x is an odd integer and |x| < 2}
   (iii) C = {x : x is an even natural number less than 12}
   (iv) D = {x^3: x $\in$ N and x $\leq$10}
6. (i) d (ii) c (iii) a (iv) b

Exercise – 2.2

1. (i), (ii) & (iii) are empty sets
2. (i) Given set = {1, 2}, Hence, it is finite.
   (ii) Given set = {5}, Hence, it is finite.
   (iii) Given set is an infinite set.
   ($\because$ the set of all prime numbers is infinite)

Exercise – 2.3

1. A, B are not equal sets; C, D are equal sets; E, F are equal sets; G, H are equal sets.

Exercise – 2.4

1. i) false ii) true iii) true
   iv) false v) true vi) false
   vii) false viii) true
2. i) true ii) true iii) false
   iv) true v) false vi) true
   vii) true viii) true ix) false
3. i) incorrect ii) correct
   (iii) incorrect (iv) correct
   (v) correct (vi) correct

4. (i) The subsets of A are ϕ, {1}, {2}, {3}, {2, 3}, {1, 3}, {1, 2} and {1, 2, 3}
   (ii) The subsets of B are Q, {c}, {d}, {c, d}

Exercise – 2.5

1. $A \cap B = \{3, 4\}$
2. $A \cap B = \{c, d\}$; $B \cap C = \{d, e, f\}$; $A \cap C = \{d\}$
3. $A \cup B = \{a, b, c\}$
4. $A \cup B = \{1, 2, 3, 4, 5\}$ and $A \cap B = \{1, 3\}$
5. $A - B = \{3, 5\}$, $B - A = \{13\}$
6. (i) & (iii) are disjoint sets.
7. $n(A) + n(B) - n(A \cup B) = n(A \cap B)$
   $17 + 23 - 38 = n(A \cap B)$
   $\therefore n(A \cap B) = 40 - 38 = 2$
8. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
   $= 10 + 11 - 6$
   $= 21 - 6 = 15.$

Creative Zone :

I. 1. i) The months of a year which begin with the letter A are April and August
The required set is {April, August}

ii) It is a set

iii) The required set is {1, 4, 9, 16, 25}
$= \{1^2, 2^2, 3^2, 4^2, 5^2\}$
It is a set.

iv) It is not a set because we cannot determine the talent boys who are in the ....

2. i) A = {x : x is a multiple of 3 < 13}
ii) B = {x : x is a power of 2 and x < 5}
iii) C = {x : x is a natural number < 8}
iv) D = {x : x is a day of the week}

3. Given A = {1, 2, 3, 4, 5, 6}, B = {5, 6, 7, 8, 9}
A – B = {1, 2, 3, 4}
B – A = {7, 8, 9}

4. We know that
$n(A \cup B) = n(A) + n(B) - n(A \cap B)$
$51 = 35 + 20 - n(A \cap B)$
$\Rightarrow n(A \cap B) = 35 + 20 - 51$
$= 55 - 51$
$\therefore n(A \cap B) = 4$

5. i) A = {11, 12, 13, ... }
This set is infinite because the above numbers are not countable.

ii) B = {1, 2, 3, 4, 5, 6, 7, 8}
This set is finite because there are 8 numbers possible to count.

iii) $C = \{1^4, 2^4, 3^4, 4^4, \ldots\}$
This set is infinite because the above number not countable.

iv) D = {4, 8, 12, 16, 20}
This set is finite because the above numbers in the set are countable.

II. 1) C 2) D 3) A 4) B 5) A
6) C 7) A 8) A 9) A 10) C
11) A 12) B 13) D 14) B 15) A
16) A

CHAPTER - 3

Polynomials

Similar Practice Questions :

Exercise – 3.1

1. i) 3 ii) 5 iii) –8 iv) –6
2. i) 4 ii) –62 iii) – 8 iv) –3
3. P(1) = 0; P(–1) = –14; P(0) = – 7;
   P(2) = 19; P(–2) = –33
4. **Hint :** Let $P(x) = x^4 - 81$, if P(–3) is equal to zero, then –3 is a zero of the given polynomial.
5. **Hint :** Let $P(x) = x^2 + 3x - 10$, if P(2) = 0, then 2 is a zero of the given polynomial.
6. **Hint :** Let $P(x) = x^2 - 4x - 12$, if P(–2) = 0, then –2 is a zero fo the given polynomial
7. i) False ii) True iii) False
   iv) True v) False

Exercise – 3.2

1. i) 0 ii) – 3, – 4 iii) – 8, – 5
   iv) 1, –1, $\pm\sqrt{-1}$
2. i) $\sqrt{6}, -\sqrt{6}$ ii) –2, –5 iii) $0, \frac{-5}{3}$
   iv) $\sqrt{13}, -\sqrt{13}$ v) $\frac{-2}{\sqrt{3}}, \frac{\sqrt{3}}{4}$
3. Let $P(x) = 3x^2 + 13x - 10$, since P(–5) and $P\left(\frac{2}{3}\right)$ are each equal to zero, 2/3 and – 5 are the zeroes of $3x^2 + 13x - 10$
4. i) –1, 2 ii) –2, 3 iii) 1, –6

Exercise – 3.3

1. i) $\frac{1}{2}, -3$ ii) $\frac{1}{3}, \frac{1}{3}$ iii) 0, –2
   iv) $\frac{1}{4}, -3$ v) $\sqrt{10}, -\sqrt{10}$
2. i) $6x^2 - 7x - 3$ ii) $x^2 - 2$
   iii) $3x^2 - x - 4$ iv) $x^2 - 2x - 8$
   v) $4x^2 - 4x + 1$
3. i) $9x^2 - 9x + 2$ ii) $x^2 - 7$
   iii) $5x^2 + 4x - 1$ iv) $36x^2 - 36x + 5$
   v) $x^2 + 3x - 18$
4. Let $P(x) = 2x^2 + x^3 - 6x - 3$. If $P(-\sqrt{3}) = 0$, then $-\sqrt{3}$ is a zero. Also, sum of the zeroes
   $$= \frac{-\text{Coefficient of } x^2}{\text{Coefficient of } x^3}$$
5. Let $P(x) = x^3 + 3x^2 - 2x - 6$. If $P(-\sqrt{2}) = 0$, then $-\sqrt{2}$ is a zero. Also, sum of the zeroes
   $$= \frac{-\text{Coefficient of } x^2}{\text{Coefficient of } x^3}$$
6. Let $P(x) = x^3 + 13x^2 + 32x + 20$. If $P(-1) = 0$, then –1 is a zero of the polynomial)

Exercise –3.4

1. i) Quotient $= x^4 - 2x^2 + 5x + 4$
   remainder $= -3x - 5$
   ii) Quotient $= x^3 - x^2 + x - 1$
   remainder = 2
   iii) Quotient $= x^2 + 1$, remainder = 8
2. **Hint :** Divide the second polynomial by the first polynomial. If the remainder is 0, then the first polynomial is a factor of the second one.
3. –1, –2, – 3, – 4
4. 1, 2, –3
5. 2, –2, 5, –6

Creative Zone :

I. 1. given $p(t) = 2t^3 + 3t - 4$

$p(1) = 2(1)^3 + 3(1) - 4$
$= 2.1 + 3.1 - 4 = 1$

$p(-1) = 2(-1)^3 + 3(-1) - 4$
$= -2 - 3 - 4 = -9$

$p(0) = 2(0) + 3(0) - 4$
$= 0 + 0 - 4 = -4$

$p(2) = 2(2)^3 + 3(2) - 4$
$= 2.8 + 3.2 - 4$
$= 16 - 6 - 4 = 6$

$p(-2) = 2(-2)^3 + 3(-2) - 4$
$= 2(-8) + 3(-2) - 4$
$= -16 - 6 - 4$
$= -26$

2. $p(x) = 4x^2 - 13x + 3$

Now $p\left(\frac{1}{4}\right) = 4\left(\frac{1}{4}\right)^2 - 13\left(\frac{1}{4}\right) + 3$

$= \frac{1}{4} - \frac{13}{4} + 3 = \frac{1 - 13 + 12}{4}$

$= \frac{13 - 13}{4} = \frac{0}{4} = 0$

$p(3) = 4(3)^2 - 13(3) + 3$
$= 4(9) - 39 + 3$
$= 36 - 39 + 3$
$= 39 - 39$
$= 0$

Since $p\left(\frac{1}{4}\right)$ and p(3) are equal to zero.

$\therefore \frac{1}{4}$ and 3 are zeroes of polynomials.

3. i) Let $p(x) = 4x^2 + 9x + 5$
$= 4x^2 + 4x + 5x + 5$
$= 4x(x+1) + 5(x+1)$
$= (x+1)(4x+5)$

To find zeroes, let p(x) = 0

$\Rightarrow (x+1)(4x+5) = 0$

$\Rightarrow x + 1 = 0$ or $4x + 5 = 0$

$x = -1$ or $x = \frac{-5}{4}$

Hence the zeroes of p(x) are –1 and $\frac{-5}{4}$

Sum of the zeroes $= -1 - \frac{5}{4} = \frac{-4-5}{4} = \frac{-9}{4}$

$= \frac{-(\text{Coefficient of } x)}{(\text{Coefficient of } x^2)}$

Product of zeroes = (–1)

$-\left(\frac{-5}{4}\right) = \frac{5}{4} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$

ii) $6x^2 + 12x$

Let $p(x) = 6x^2 + 12x = 6x(x+2)$

To find zeroes, Let p(x) = 0

$\Rightarrow$ 6x(x+2) = 0

$\Rightarrow$ x = 0 or x + 2 = 0

x = – 2

Hence the zeroes of p(x) are 0 and – 2

Sum of the zeroes = 0+(–2) = – 2

$$= \frac{-12}{6} = \frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

Product of zeroes $= 0 \times (-2) = 0 = \frac{0}{6}$

$$= \frac{\text{Constant term}}{\text{Coefficient of } x^2}$$

iii) $t^2 - 16$

Let $p(t) = t^2 - 16$

To form zeroes, Let p(t) = 0

$\Rightarrow t^2 - 16 = 0$

$\Rightarrow t^2 = 16$

$\Rightarrow t = \pm\sqrt{16} = \pm 4$

t = – 4 and 4

Hence the zeroes of p(t) are –4 and 4.

Sum of the zeroes $= -4 + 4 = 0 = \frac{0}{1}$

$$= \frac{-\text{coefficient of } t}{\text{Coefficient of } t^2}$$

Product of zeroes $= -4 \times 4 = -16 = -\frac{16}{1}$

$$= \frac{\text{Constant term}}{\text{Coefficient of } t^2}$$

4. The given polynomial is $x^3 + 5x^2 - 2x - 24$

Comparing the given polynomial with ax^3+bx^2+cx+d, we get

a = 1, b = 5, c = – 2, d = – 24

Let p(x) $= x^3 + 5x^2 - 2x - 24$.

$p(2) = (2)^3+5(2)^2 - 2(2) - 24$

$= 8 + 5(4) - 4 - 24$

$= 8 + 20 - 4 - 24$

$= 28 - 28 = 0$

$p(-3) = (-3)^3+5(-3)^2 - 2(-3) - 24$

$= -27 + 45 + 6 - 24$

$= 51 - 51 = 0$

$p(-4) = (-4)^3+5(-4)^2 - 2(-4) - 24$

$= -64 + 80 + 8 - 24$

$= 88 - 88 = 0$

$\therefore$ 2, – 3 and – 4 are the zeroes of the given polynomial.

So, $\alpha - 2, \beta = -3, \gamma = -4$

$\alpha + \beta + \gamma = 2 - 3 - 4$

$$= -5 = -\frac{5}{1} = -\frac{b}{a}$$

$\alpha\beta + \beta\gamma + \gamma\alpha = (2 \times 3) + (-3 \times -4) + (-4 \times 2)$

$= -6 + (+12) + (-8)$

$= -6 + 12 - 8$

$= 12 - 14$

$= -2 = -\frac{2}{1} = \frac{c}{a}$

$\alpha\beta\gamma = (2)(-3)(-4) = 24 = -\frac{(-24)}{1} = \frac{-d}{a}$

5. The given polynomial is $x^4 + x^3 - 7x^2 - x + 6$

Two of its zeroes are 1 and – 1

$\therefore$ $(x-1)(x+1) = x^2 - 1$ is a factor of the given polynomial.

We apply the division alogarithm to the given polynomial and $x^2 - 1$.

$x^2 - 1$) $x^4 + x^3 - 7x^2 - x + 6$ ($x^2 + x - 6$

$x^4 - x^2$

– +

$x^3 - 6x^2 - x + 6$

$x^3 \quad - x$

– +

$-6x^2 + 6$

$-6x^2 + 6$

0

Now $x^4 + x^3 - 7x^2 - x + 6 = (x^2 - 1)(x^2 + x - 6)$

$\Rightarrow x^2 + x - 6 = x^2 + 3x - 2x - 6$

$= x(x+3) - 2(x+3)$

$= (x+3)(x-2)$

$\therefore$ The zeroes of (x+3)(x – 2) are – 3 and 2

$\therefore$ All the zeroes of given polynomial are

1, –1, –3 and 2.

II. 1) C 2) C 3) B 4) A 5) A

6) B 7) D 8) D 9) C 10) A

CHAPTER – 4

Pair of Linear Equations in two Variables

Similar Practice Questions :

Exercise – 4.1

1. a) imperfect at a point b) parallel lines
   c) coincident d) parallel lines
   e) coincident f) intersect at a point
   g) parallel lines
2. a) consistent b) inconsistent
   c) consistent d) consistent
   e) inconsistent f) dependent (consistent)
3. Boys : 46, Girls : 34
4. Cost of one orange : Rs.6 and one apple Rs.15
5. Length : 24 units; Breadth : 15 units
6. Students : 36; Benches : 7
7. Rs.5 stamps : 18, Rs.10 stamps : 25
8. Adult's ticket Rs.25, child ticket Rs.10

Exercise – 4.2

1. Rs. 16,000, Rs. 14,000
2. 25 and 52
   3. 84°, 96°
4. fixed charge : Rs.60 and charge for km is Rs.12, charge for 30km = Rs.420
5. $\frac{3}{4}$
6. 25 kmph; 50 kmph
7. 70°, 20°
8. 196 pages, 168 pages
9. 50 questions
10. Rs.10,000/- at 12% and Rs.6,000 at 20%

Exercise – 4.3

1. i) $x = \frac{3}{7}; y = \frac{2}{3}$ ii) x = 1, y = 1
   iii) x = 16, y = 25 iv) x = 8, y = 3
   v) $x = \frac{5}{2}; y = \frac{1}{2}$ vi) $x = \frac{1}{2}; y = \frac{1}{3}$
   vii) $x = \frac{1}{4}; y = \frac{1}{7}$ viii) x = 8, y = 3
   ix) x = 2, y = 4 x) x = 1, y = –1
   xi) x = 2, y = 1 xii) x = y = ab

2. i) speed of stream : 2kmph, speed of boat in still water : 10kmph
   ii) speed of the train : 80kmph, speed of the car : 30kmph
   iii) one man can do the work alone in 168 days and one woman in 252 days.

Creative Zone :

I. 1. Let the number of Pants = x

and the number of Shrits = y

By the problem y = 3x – 3

$\Rightarrow 3x - y = 3$ —— (1)

and $y = 4x - 5$

$\Rightarrow 4x - y = 5$ —— (2)

$3x - y = 3$

$4x - y = 5$

$-\quad +\quad -$

$-x \quad = -2$

$x = 2$

Solving eqs (1) and (2)

$3x - y = 3$

$4x - y = 5$

Substitute x = 2 in eqn —— (1)

$3 \times 2 - y = 3$

$-y = 3 - 6 = -3$

$y = 3$

∴ Number of pants = x = 2

and number of Shirts = y = 3

2. Let the speed of the car that starts from A be x kmph.

Let the speed of the car that starts from B be y kmph.

Distance between A and B = 120 km.

If the two cars travel in the some directions, their relative speed = (x – y) kmph given that the cars will meet in 4 hours.

∴ Speed × time = Distance travelled

$(x - y) \times 4 = 120$

$\Rightarrow 4x - 4y = 120$

$\Rightarrow x - y = 30$ —— (1)

If the two cars travel in the opposite direction their relative speed = (x + y) kmph.

given that cars will meet in 2 hours

∴ Speed × time = Distance travelled

$(x + y) \times 2 = 120$

$\Rightarrow 2x + 2y = 120$

$\Rightarrow x + y = 60$ —— (2)

Solving eqns (1) and (2)

$x - y = 30$

$x + y = 60$

Adding $2x = 90$

$x = \frac{90}{2} = 45$ kmph

Substitue x = 45 in (1)

$45 - y = 30$

$\Rightarrow -y = 30 - 45$

$\Rightarrow -y = -15$

$\therefore y = 15$ kmph.

$\therefore$ The speeds of the cars are 45 kmph and 15 kmph.

3. Given $5x + 4y = 6xy$

$\Rightarrow \frac{5x}{xy} + \frac{4y}{xy} = 6$

$\Rightarrow \frac{5}{y} + \frac{4}{x} = 6$

and $3x + 4y = 4xy$

$\Rightarrow \frac{3x}{xy} + \frac{4y}{xy} = 4$

$\Rightarrow \frac{3}{y} + \frac{4}{x} = 4$

Take $\frac{1}{x} = a$ and $\frac{1}{y} = b$, then the above equation reduces to

$5b + 4a = 6 \Rightarrow 4a + 5b = 6$ ——— (1)

$3b + 4a = 4 \Rightarrow 4a + 3b = 4$ ——— (2)

Solving equations (a) and (2)

$4a + 5b = 6$

$4a + 3b = 4$

$- \quad - \quad -$

$2b = 2 \Rightarrow b = \frac{2}{2} = 1$

Substituting b = 1 in eq (1)

$4a + 5$

$4a + 5 \times 1 = 6$

$4a + 5 = 6$

$\Rightarrow 4a = 6 - 5 = 1$

$\Rightarrow a = \frac{1}{4}$

But $a = \frac{1}{y} \Rightarrow \frac{1}{y} = \frac{1}{4} \Rightarrow x = 4$

and $b = \frac{1}{y} \Rightarrow \frac{1}{y} = 1 \Rightarrow y = 1$

$\therefore$ Solution (x, y) = (4, 1)

II.

1) D	2) D	3) C	4) D	5) A
6) A	7) A	8) A	9) A	10) B
11) A	12) A	13) A	14) D	15) B
16) B				

CHAPTER - 5

Quadratic Equations

Similar Practice Questions :

Exercise – 5.1

1. i) Yes ii) Yes iii) Yes iv) No v) No
2. i) $x^2 - 25x + 150 = 0$

   ii) $x^2 + 15x - 2700 = 0$

   iii) $x^2 + 4x - 192 = 0$

   iv) $x^2 - 2x - 360 = 0$

Exercise –5.2

1. i) – 4, 5 ii) 7, $\frac{-4}{3}$ iii) –4, 6

   iv) – 2, $\frac{5}{2}$ v) 4, $\frac{1}{4}$ vi) 2, $\frac{-9}{2}$

   vii) – 2, 9 viii) $\frac{-1}{3}, \frac{8}{9}$ ix) 4, $\frac{-2}{9}$

   x) 3, $\frac{4}{3}$

2. 13, 15 3. 4, 5, 6 4. 28, 16
5. 16cm, 30cm
6. Marks in mathematics = 12,

   Marks in science = 16.

Exercise – 5.3

1. i) The solution does not exist

   ii) $\frac{-\sqrt{2}}{3}, \frac{-\sqrt{2}}{3}$ iii) 2, $\frac{1}{3}$ iv) 4, $\frac{-3}{5}$

2. 30 3. 2 km/hour
4. 15m, 10m 5. 15 days
6. 12cm, 16cm

Exercise – 5.4

1. i) Real and distinct; $\frac{1}{2}, \frac{-2}{3}$

   ii) Real and equal; $\frac{2}{5}, \frac{2}{5}$

   iii) No real roots.

   iv) Real and distinct : –1, 4

2. i) –3 or 5 ii) ± 3 iii) 9
3. length = 32 mts; breadth = 16 mts
4. not possible

Creative Zone :

I. 1. Let x be the one number.

Then the other number = x + 5

By the problem, product of number = 300

$x(x + 5) = 300$

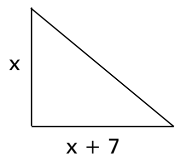
$\Rightarrow x^2 + 5x = 300$

$\Rightarrow x^2 + 5x - 300 = 0$

2. Let the altitude of the triangle = h = x cm

Triangle = h = x cm

Then its hase = x + 7



Area of the triangle = $\frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times (x + 7)(x) = \frac{x^2 + 7x}{2}$

By problem, $\frac{x^2 + 7x}{2} = 30$

$\Rightarrow x^2 + 7x = 30 \times 2$

$\Rightarrow x^2 + 7x = 60$

$\Rightarrow x^2 + 7x - 60 = 0$

$\Rightarrow x^2 + 12x - 5x - 60 = 0$

$\Rightarrow x(x + 12) - 5(x + 12) = 0$

$\Rightarrow (x + 12)(x - 5) = 0$

$\Rightarrow x + 12 = 0$ or $x - 5 = 0$

$\Rightarrow x = -12$ or $x = 5$

But x can't be negative

$\therefore x = 5$

Hence altitude = x = 5 cm and

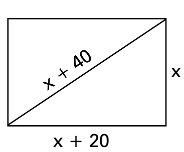
base = x + 7 = 5 + 7 = 12 cm

3. Let the shorter side of the rectangular plot = x cm

Then its longer side

= x + 20 m

and its diagonal = x + 40 m



By pythagos theorem,

$(\text{Side})^2 + (\text{Side})^2 = (\text{Hypotenusi})^2$

$\Rightarrow x^2 + (x + 20)^2 = (x + 40)^2$

$\Rightarrow x^2 + x^2 + 400 + 40x = x^2 + 1600 + 80x$

$\Rightarrow x^2 + 40x - 80x + 400 - 1600 = 0$

$\Rightarrow x^2 - 40x - 1200 = 0$

$\Rightarrow x^2 - 60x + 20x - 1200 = 0$

$\Rightarrow x(x - 60) + 20(x - 60) = 0$

$\Rightarrow (x - 60)(x + 20) = 0$

$\Rightarrow x - 60 = 0$ or $x + 20 = 0$

$\Rightarrow x = 60$ or $x = -20$

Bu x can't be negative

$\therefore x = 60$ m

$\therefore$ The longer side = x + 20 = 60 + 20 = 80 m and shorter side = x = 60 m.

4. Let the age of one of the two friends be x years.

Then the age of the other = 30 – x

Then 5 years ago, their ages would be (x – 5) and (30 – x – 5) = 25 – x

By the problem, $(x - 5)(25 - x) = 75$

$\Rightarrow 25x - x^2 - 125 + 5x = 75$

$\Rightarrow -x^2 + 30x - 125 - 75 = 0$

$\Rightarrow -x^2 + 30x - 200 = 0$

$\Rightarrow x^2 - 30x + 200 = 0$ ..... (1)

Here a = 1, b = –30, c = 200

$b^2 - 4ac = (-30)^2 - 4.1(200)$

$= 900 - 800$

$= 100 > 0$

$\therefore$ Root are real and distinct.

Hence the situation is possible

from (1) $x^2 - 30x + 200 = 0$

$x^2 - 20x - 10x + 200 = 0$

$x(x - 20) - 10(x - 20) = 0$

$\Rightarrow (x - 20)(x - 10) = 0$

$\Rightarrow x - 20 = 0$ or $x - 10 = 0$

$\Rightarrow x = 20$ or $x = 10$

When x = 20,

the age of are of the friends = 20 years

then the age of the other = 30 – x

= 30 – 20

= 10 years

When x = 10,

the age of are of the friends = 10 years

then the age of the other = 30 – x

= 30 – 10 = 20 years

II.

1) C	2) A	3) D	4) D	5) D
6) D	7) A	8) A	9) A	10) A
11) D	12) A	13) D	14) C	15) A

CHAPTER - 6

Progressions

Similar Practice Questions

Exercise – 6.1

1. i) $a = \frac{1}{6}, d = \frac{1}{6}$ ii) $a = \pi + 3, d = -2$
   iii) $a = \sqrt{2}, d = \sqrt{2}$ iv) $a = a - 3b, d = 4b$
   v) $a = 0, d = -4$ vi) $a = 2, d = 3$
2. i) 8, 7, 6, 5 ii) –1, 2, 5, 8
   iii) x + y, x – y, x – 3y, x – 5y
   iv) 0, – 2, – 4, – 6 v) 9, 13, 17, 21
3. i) Yes, $d = \frac{5}{4}$, Next three terms are : $\frac{11}{4}, 4, \frac{21}{4}$
   ii) Yes, d = 0.02, next three terms are : 0.86, 0.88, 0.9
   iii) Yes, $d = \frac{5}{4}$, next three terms are : $\frac{25}{4}, \frac{15}{2}, \frac{35}{4}$
   iv) No
   v) No
   vi) No

Exercise – 6.2

1. i) –15 ii) 18 iii) 20 iv) 3 v) 1.5
   vi) –1 vii) –16 viii) $\frac{-189}{10}$
2. i) 123 ii) 7
3. – 69, – 94
4. 26
5. 51
6.
7. yes; 2a, 2d, 2a + (n – 1) 2d
8. 7q – 6q, 4p – 3q + $(q - p)^n$
9. –74, (26 – 5n)
10. $\frac{1}{2}, \frac{2}{3}$ and $\frac{3}{4}$

Exercise – 6.3

1. i) 348, $2n^2 + 5n$ ii) 2600, $n^2 + 2n$
   iii) 1218, 7250 iv) 3969, $\frac{1}{8}n(5n - 13)$
2. –1696
3. 2310
4. 2n(n + 2)
5. 10
6. 82350
7. 3, 7, 11, 15,....
8. 44
9. 6, 11, 16, 21....
10. 60
11. 128
12. 12^{th} term
13. 163
14. 108
15. 44550
16. 37674
17. 1625
18. – 925
19. n = 38, $S_n = 6973$
20. 4

Exercise – 6.4

1. i) $r = \frac{y}{x^2}$, next 3 terms are : $\frac{y^2}{x^5}, \frac{y^3}{x^7}, \frac{y^4}{x^9}$
   ii) r = 0.1, next 3 terms are : 0.005, 0.0005, 0.00005
   iii) $r = \sqrt{2}$, next 3 terms are : $4\sqrt{3}, 4\sqrt{6}, 4\sqrt{12}$
   iv) $r = \frac{-1}{3}$, next 3 terms are : $\frac{1}{9}, \frac{-1}{27}, \frac{1}{81}$
   v) r = 2, next 3 terms are : 32, 64, 128
   vi) r = 9, next 3 terms are : – 486, – 4374, – 39366
2. i) Not a G.P. ii) Yes. $\frac{8}{27}, \frac{16}{81}, \frac{32}{243}$
   iii) Yes, $a^4, -a^5, a^6$ iv) Not a G.P.
   v) Yes. – 54, $\frac{81}{2}, \frac{-243}{8}$ vi) Yes, $\frac{-1}{32}, \frac{1}{128}, \frac{-1}{512}$
3. x = 4
4. x = 2
5. i) $\sqrt{7}, \sqrt{21}, 3\sqrt{7}, 3\sqrt{21}$ ii) 10, –20, 40, –80
   iii) $-x^4, x^5, -x^6, x^7$ iv) – 243, 81, – 27, 9

Exercise – 6.5

1. i) $r = -3, a_n = (-2)(-3)^{n-1}$
   ii) $r = 2, a_n = 5.(2)^{n-1}$
   iii) $r = \frac{1}{2}, a_n = 4\left(\frac{1}{2}\right)^{n-1}$ (or) 2^{3-n}
   iv) $r = 3, a_n = 3(3)^{n-1} = 3^n$
2. $4(3)^{19}, 4(3)^{n-1}$
3. i) 1.728 ii) 24
4. i) 11 ii) 7 iii) 10
5. $\left(\frac{2}{3}\right)^{13}$
6. x = ± 1
8. 9^{th}
9. 3^{rd}
10. ± 81

Creative Zone :

I. 1. $\pi + 2, \pi, \pi - 2, \pi - 4, ...$

First term $= \pi + 2$

Common difference $= d = t_2 - t_1$

$= \pi - (\pi + 2) = -2$

2. Given An A.P whose

5^{th} term $= a + 4d = -6$ —— (1)

and 10^{th} term $= a + 9d = -21$ —— (2)

(–) $-5d = 13$

$d = \frac{15}{-5} = -3$

Substituting d = – 3 in equation (1)

$a + 4(-3) = -6$

$a - 12 = -6$

$\Rightarrow a = 12 - 6 = 6$

Let nth term of given A.P be equal to zero.

i.e., $a_n = a + (n-1)d$

$0 = 6 + (n-1) - 3$

$0 = 6 - 3n + 3$

$0 = 9 - 3n$

$\Rightarrow 3n = 9$

$n = \frac{9}{3} = 3$

$\therefore$ The 3^{rd} term of given A.P is zero.

3. Given in which $S_n = 3n + n^2$

Taking n = 1, we get, $S_1 = 3.1 + 1^2 = 3 + 1 = 4$

n = 2, we get, $S_2 = 3.2 + 2^2 = 6 + 4 = 10$

n = 3, we get, $S_3 = 3.3 + 3^2 = 9 + 9 = 18$

n = 4, we get, $S_4 = 3.4 + 4^2 = 12 + 16 = 28$

Hence $a_1 = a = S_1 = 4$

$a_2 = S_2 - S_1 = 10 - 4 = 6$

$a_3 = S_3 - S_2 = 18 - 10 = 8$

Common difference $= d = a_2 - a_1$

$= 6 - 4 = 2$

Now $a_{10} = a + 9d$

$= 4 + 9 \times 2 = 4 + 18 = 22$

$a_n = a + (n-1)d$

$= 4 + (n-1)2$

$= 4 + 2n - 2$

$= 2n + 2$

4. Give x, x + 4 and x + 6 are in G.P

Let $a_1 = x, a_2 = x + 4, a_3 = x + 6$

Since they are in G.P

$\therefore \frac{a_2}{a_1} = \frac{a_3}{a_2} (= r)$

$\Rightarrow (x+4)^2 = x(x +)$

$\Rightarrow x^2 + 16 + 8x = x^2 + 6x$

$\Rightarrow 8x - 6x = -16$

$\Rightarrow 2x = -16$

$\therefore x = -8$

5. Given G.Ps are

256, 64, 16, ... and $\frac{1}{16}, \frac{1}{4}, 1,$

Here a = 256, $r = \frac{a_2}{a_1} = \frac{64}{256} = \frac{1}{4}$

Here $a = \frac{1}{16}$, $r = \frac{a_2}{a_1} = \frac{\frac{1}{4}}{\frac{1}{16}} = \frac{1}{4} \times \frac{16}{1} = 4$

Given n^{th} terms are equal.

i.e., $a = ar^{n-1}$

$\Rightarrow 256\left(\frac{1}{4}\right)^{n-1} = \frac{1}{16} \times (4)^{n-1}$

$\Rightarrow 256 \times \frac{1}{4^{n-1}} = \frac{1}{16} \times 4^{n-1}$

$\Rightarrow 256 \times 16 = 4^{n-1} \times 4^{n-1}$

$\Rightarrow 4^4 \times 4^2 = 4^{(n-1)+(n-1)}$

$[\therefore a^m \times a^n = a^{m+n}]$

$\Rightarrow 4^6 = 4^{2n-2}$

$\Rightarrow 2n - 2 = 6$

$\Rightarrow 2n = 6 + 2 = 8$

$\Rightarrow n = 4$

$\therefore$ The 4^{th} terms of the two G.Ps are equal.

II.

1) D	2) D	3) B	4) B	5) C
6) C	7) A	8) B	9) A	10) D
11) D	12) A	13) C	14) B	15) C
16) D	17) C	18) A	19) C	20) A
21) D	22) A	23) A	24) C	25) A

CHAPTER - 7

Coordinate Geometry

Similar Practice Questions :

Exercise –7.1

1. i) 13 ii) $\sqrt{58}$ iii) $2\sqrt{10}$ iv) $2\sqrt{5}$
   v) 5 vi) $\sqrt{26}$
7. No.
   $\because$ Area of the triangle = 0
8. (0, – 2)
9. x – y = 3

Exercise –7.2

1. 3 : 2 2. 2 : 5 (Externally)
3. 6, 0 4. $\frac{7}{3}, -2$
5. i) (1, 3) ii) (2, 2)
   iii) (4, 0) iv) $\left[\frac{8}{3}, \frac{10}{3}\right]$

Exercise –7.3

1. i) 6 ii) 47.5 iii) 10 iv) 35
2. i) 11 ii) 10 iii) 5 iv) 2
3. i) 28 sq.units ii) 5.5 sq.units
   iii) 15 sq.units iv) (ab)
   v) 132 sq.units

Exercise –7.4

1. i) $\frac{1}{3}$ ii) $\frac{3}{2}$ iii) 1 iv) 1
   v) $\frac{-1}{13}$ vi) $\frac{7}{4}$ vii) $\frac{1}{6}$ viii) $\frac{-1}{6}$
2. i) $\sqrt{3}$ ii) 1 iii) not defined
   iv) $\frac{-1}{\sqrt{3}}$ 3. 7 4. 3, 6

Creative Zone :

I. 1. Let A = (–1, 0), B = (2, 1), C = (5, 4), D = (2, 3)

Distance formula = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$AB = \sqrt{(2+1)^2 + (1+0)^2}$

$= \sqrt{3^2 + 1^2} = \sqrt{9+1} = \sqrt{10}$

$BC = \sqrt{(5-2)^2 + (4-1)^2}$

$= \sqrt{3^2 + 3^2} = \sqrt{9+9} = \sqrt{18}$

$CD = \sqrt{(2-5)^2 + (3-4)^2}$

$= \sqrt{(-3)^2 + (-1)^2} = \sqrt{9+1} = \sqrt{10}$

$DA = \sqrt{(-1-2)^2 + (0-3)^2}$

$= \sqrt{(-3)^2 + (-3)^2} = \sqrt{9+9} = \sqrt{18}$

$AC = \sqrt{(5+1)^2 + (4-0)^2}$

$= \sqrt{6^2 + 4^2} = \sqrt{36+16} = \sqrt{52}$

$BD = \sqrt{(2-2)^2 + (3-1)^2} = \sqrt{0+2^2} = \sqrt{4} = 2$

Since AB = CD and BC = DA and also AC ≠ BD

$\therefore$ Given verticles form a parallelogram.

2. Given A = (–1, 12) and B = (8, –6)

Let P (1, 8) divides $\overline{AB}$ in the ratio k = 1 internally

By section formula

$p(x, y) = \left(\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right)$

$\Rightarrow (1, 8) = \left(\frac{k \times 8 + 1 \times -1}{k+1}, \frac{k \times -6 + 1 \times -12}{k+1}\right)$

$\Rightarrow (1, 8) = \left(\frac{8k-1}{k+1}, \frac{-6k+12}{k+1}\right)$

Equations x (x, y) co-ordinate of the above

$1 = \frac{8k-1}{k+1} \Rightarrow k + 1 = 8k - 1$

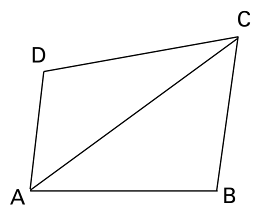
$\Rightarrow 1 + 1 = 8k - k$

$\Rightarrow 2 = 7k$

$\Rightarrow k = \frac{2}{7} = 2 : 7$

$\therefore$ The ratio is k = 1 = 2 : 7

3.



Given A(–1, 1), B(0, –2), C(6, 1) and D(5, 6) are the verticles of the quadrilateral ABCD.

Area of quadrilateral ABCD = Area of ΔABC + Area of ΔACD

A = (–1, 1), B = (0, –2), C = (6, 1)

Area of $\Delta ABC = \frac{1}{2}|x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$

Area of $\Delta ABC = \frac{1}{2}|-1(-2 - 1) + 0(1 - 1) + 6(1 + 2)|$

$= \frac{1}{2}|-1(-3) + 0(0) + 6(3)|$

$= \frac{1}{2}|3 + 0 + 18|$

$= \frac{|21|}{2} = \frac{21}{2}$ Sq.units

A = (–1, 1), C = (6, 1), D = (5, 6)

Area of $\Delta ABC = \frac{1}{2}|-1(1 - 6) + 6(6 - 1) + 5(1 - 1)|$

$= \frac{1}{2}|-1(-5) + 6(5) + 5(0)|$

$= \frac{1}{2}|5 + 30 + 0|$

$= \frac{1}{2}|35| = \frac{35}{2}$ Sq.units

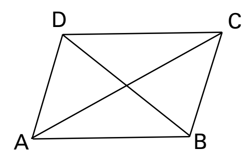
∴ Area of quadrileteral ABCD = Area of ΔABC +Area of ΔACD

$= \frac{21}{2} + \frac{35}{2} = \frac{21+35}{2}$

$= \frac{56}{2}$ = 28 Sq.units

4. Given A = (3, 4), B = (6, 5), C = (8, 8)

Let D = (x, y) be the fourth vertex



In a parallelogram,

Mid point of AC = Mid point of BC

$$\left(\frac{3+8}{2}, \frac{4+8}{2}\right) = \left(\frac{6+x}{2}, \frac{5+y}{2}\right)$$

$$\Rightarrow \left(\frac{11}{2}, \frac{12}{2}\right) = \left(\frac{6+x}{2}, \frac{5+y}{2}\right)$$

Equations x and y co-ordinates on both sides

$\frac{6+x}{2} = \frac{11}{2}$

$\Rightarrow 6 + x = 1$

$\Rightarrow x = 11 - 6 = 5$

and $\frac{5+y}{2} = \frac{12}{2}$

$\Rightarrow 5 + y = 12$

$\Rightarrow y = 12 - 5 = 7$

∴ Fourth vertex D = (x, x) = (5, 7)

II. 1) B 2) C 3) A 4) A 5) B
6) B 7) D 8) A 9) D 10) C
11) C 12) B

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