Exercise 2.1 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.1 Solutions
Question 1.
Find the degrees of the following polynomials.
(i) $2x^2 - 5x + 3$
Sol:$2x^2 - 5x + 3$; Here the highest power of variable x is 2, so the degree of the given polynomial is 2.
(ii) $y^3 + 2y - 1$
Sol:$y^3 + 2y - 1$; Here the highest power of variable y is 3, so the degree of the given polynomial is 3.
(iii) – 9
Solution:
-9; since we can write -9 as $-9x^{\circ}$, here the power of variable x is 0 so the degree of constant polynomial -9 is 0.
(iv) $4z - 3$
Solution:
$4z - 3$; Here the highest power of variable z is 1, so the degree of the given polynomial is 1.
Question 2.
Write the polynomials of degree 1, 2 and 3.
Solution:
Degree 1 (Linear): $4x + 2$
Degree 2 (Quadratic): $3x^2 -4x +7$
Degree 3 (Cubic): $x^3 + 2x^2 - x + 10$
Question 3.
What are the coefficients of x2 and x3 in the polynomial $x^4 - 3x^3 + 6x^2 - 2x + 7$?
Solution:
The term containing x^2 is $6x^2$, so, the coefficient of x^2 is 6. The term containing x^3 is $-3x^3$, so the coefficient of x^3 is -3.
Question 4.
What is the coefficient of z in the polynomial $4z^3 + 5z^2 - 11$?
Solution:
Since we can rewrite $4z^3 + 5z^2 - 11$ as $4z^3 + 5z^2 + 0z - 11$,
∴ Coefficient of z in the given polynomial is 0.
Question 5.
What is the constant term of the polynomial $9x^3 + 5x^2 - 8x - 10$?
Solution:
The constant term of the given polynomial is -10.

Exercise 2.2 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.2 Solutions
Question 1.
Find the value of the linear polynomial $5x - 3$ if:
(i) $x = 0$
Solution:
When $x = 0$; the linear polynomial
$5x - 3 = 5 \times 0 - 3 = -3$
(ii) $x = -1$
Solution:
When $x = -1$; the linear polynomial
$5x - 3 = 5 \times (-1) - 3 = -5 - 3 = -8$
(iii) $x = 2$
Solution:
When $x = 2$; the linear polynomial
$5x - 3 = 5 \times 2 - 3 = 10 - 3 = 7$
Question 2.
Find the value of the quadratic polynomial Is2 -4s+ 6 if:
(i) $s = 0$
(ii) $s = -3$

(iii) s = 4
Solution:(i) s = 0; the quadratic polynomial
$7s^2 – 4s + 6 = 7(0)^2 – 4(0) + 6 = 0 – 0 + 6 = 6$
(ii) s = -3; the quadratic polynomial
$7s^2 – 4s + 6 = 7(-3)^2 – 4(-3) + 6$
= 7(9) + 12 + 6
= 63 + 12 + 6
= 81
(iii) s = 4; the quadratic polynomial
$7s^2 – 4s + 6$
$= 7(4)^2 – 4(4) + 6$
= 7(16) – 16 + 6
= 112 – 16 + 6
= 102
Q3.The present age of Salihs mother is three times Salil's present age. After 5 years, their ages will add up to 70 years. Find their present ages.
Solution:
Let Salil's present age be x.
Then, Salil's mother's present age = 3x.
After 5 years, Salil's age = x + 5 and his mother's age = 3x + 5.
Their total age after 5 years = (x + 5) + (3x + 5) = 70.
4x + 10 = 70
⇒ 4x = 60
⇒ x = 15
Thus, Salil's present age is 15 years and his mother's present age is 3 × 15 = 45 years.
Q 4.The difference between two positive integers is 63. The ratio of the two integers is 2 : 5. Find the two integers.
Solution:Let the two integers be 2x and 5x.
Their difference: 5x – 2x = 63
⇒ 3x = 63
⇒ x = 21
∴ The first integer = 2 × 21 = 42
And the second integer = 5 × 21 = 105
Thus, the two integers are 42 and 105.
Q 5.Ruby has 3 times as many two-rupee coins as she has five- rupee coins. If she has a total of ?88, how many coins does she have of each type?
Solution:
Let the number of five-rupee coins be x.
Then, the number of two-rupee coins = 3x.
Total value of coins = 2(3x) + 5(x) = 88
⇒ 6x + 5x = 88
⇒ 11x = 88
⇒ x = 8
Number of five-rupee coins = 8
And number of two-rupee coins = 8 × 3 = 24
Thus, Ruby has 8 five-rupee coins and 24 two-rupee coins.
Q 6.A farmer cuts a 300 feet fence into two pieces of different sizes. The longer piece is four times as long as the shorter piece. How long are the two pieces?
Solution:Let the length of the shorter piece be x.
Then, the length of the longer piece is 4x.

Total length of the fence = x + 4x = 300
⇒ 5x = 300
⇒ x = 60
Thus, the shorter piece is 60 feet long, and the longer piece is 60 × 4 = 240 feet long.
Q 7.If the length of a rectangle is three more than twice its width and its perimeter is 24 cm, what are the dimensions of the rectangle?
Solution:Let the width of the rectangle be x.
Then, the length of the rectangle = 2x + 3.
Perimeter: 2[(2x + 3) + x] = 24
⇒ 2(3x + 3) = 24
⇒ 6x + 6 = 24
⇒ 6x = 18
⇒ x = 3
Thus, the width is 3 cm, and the length is 2 × 3 + 3 = 9 cm.

Exercise 2.3 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.3 Solutions

Q 1.A student has ₹ 500 in her savings bank account. She gets ₹ 150 every month as pocket money. How much money will she have at the end of every month from the second month onwards? Find a linear expression to represent the amount she will have in the nth month.
Solution:Initial amount = ₹ 500
Pocket money per month = ₹ 150
Money she will have at the end of every month:

Month	2	3	4	5	...
Money (₹)	500 + 150 × 2 = 800	500 + 150 × 3 = 950	500 + 150 × 4 = 1100	500 + 150 × 5 = 1250	...

The total amount, A(n), at the end of the 1th month can be expressed as:
A(n) = ₹ (500 + 150n), where n is the number of months.
Q 2.A rally starts with 120 members. Each hour, 9 members drop out of the group. How many members will remain after 1,2,3,… hours? Find a linear expression to represent the number of members at the end of the nth hour.
Solution:Number of initial members = 120
Members dropping per hour = 9
Number of members after 1, 2, 3,… hours:

Hours	1	2	3	4	...
Number of members	120 – 9 × 1 = 111	120 – 9 × 2 = 102	120 – 9 × 3 = 93	120 – 9 × 4 = 84	...

The total number of members remaining, M(n), at the end of the nth hour can be expressed as:
M(n) = 120 – 9n, where n is the number of hours.
Q3.Suppose the length of a rectangle is 13 cm. Find the area if the breadth is (i) 12 cm, (ii) 10 cm, (iii) 8 cm. Find the linear pattern representing the area of the rectangle.
Solution:Length = 13 cm

Area = Length × Breadth
(i) When the breadth is 12 cm:
Area = 13 × 12 = 156 cm^2
(ii) When the breadth is 10 cm:
Area = 13 × 10 = 130 cm^2
(iii) When the breadth is 8 cm:
Area = 13 × 8 = 104 cm^2
The linear expression representing the area A(b) in terms of the breadth b is:
A (b) = 13 b, where b is the breadth of the rectangle.
Q 4.Suppose the length of a rectangular box is 7 cm and breadth is 11 cm. Find the volume if the height is (i) 5 cm, (ii) 9 cm, (iii) 13 cm. Find the linear pattern representing the volume of the rectangular box.
Solution:Since, length = 7 cm, breadth = 11 cm
Volume (V) = Length × Breadth × Height
(i) When the height is 5 cm: V = 7 × 11 × 5 = 385 cm^3
(ii) When the height is 9 cm: V = 7 × 11 × 9 = 693 cm^3
(iii) When the height is 13 cm: V = 7 × 11 × 13 = 1001 cm^3
The linear expression representing the volume V(h) in terms of the height h is:
V(h) = 77h, where h is the height of the rectangular box.
Q 5.Sarita is reading a book of 500 pages. She reads 20 pages every day. How many pages will be left after 15 days? Express this as a linear pattern.
Solution:Total pages in the book = 500
The number of pages read per day = 20
The number of pages left after n days, L(n), can be expressed as:
L(n) = 500 – 20n,
For n = 15 days:
L(15) = 500 – 20(15)
= 500 – 300 = 200
So, after 15 days, 200 pages of the book will be left to read.
Exercise 2.4 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.4 Solutions
Q 1.Suppose a plant has height 1.75 feet and it grows by 0.5 feet each month.
(i) Find the height after 7 months.
Solution:
Initial height = 1.75 feet
Growth per month = 0.5 feet
Height after 7 months = Initial height + (Growth per month × 7)
∴ h= 1.75+ (0.5 × 7)
= 1.75 + 3.5
= 5.25 feet
(ii) Make a table of values for t varying from 0 to 10 months and show how the height, h, increases every month.
Solution:

Time (months)	Height (h feet)
0	1.75
1	2.25
2	2.75
3	3.25
4	3.75
5	4.25
6	4.75

7	5.25
8	5.75
9	6.25
10	6.75

(iii) Find an expression that relates h and t, and explain why it represents linear growth.
Solution:
The height h after t months can be expressed as: h(t)= 1.75 + 0.5;
This expression represents linear growth because the height increases by a constant amount (0.5 feet) for each unit increase in time (months).
Q 2.A mobile phone is bought for ₹ 10,000. Its value decreases by ₹ 800 every year.
(i) Find the value of the phone after 3 years.
Solution:
Initial value = ₹ 10,000
Decrease per year = ₹ 800
Value after 3 years = Initial value – (Decrease per year × 3)
∴ Value (v) = ₹ 10000 – (₹ 800 × 3)
= ₹ 10000 – ₹ 2400
= ₹ 7600
(ii) Make a table of values for; varying from 0 to 8 years and show how the value of the phone, v, depreciates with time.
Solution:

Time (t years)	Value (v in ₹)
0	10,000
1	9,200
2	8,400
3	7,600
4	6,800
5	6,000
6	5,200
7	4,400
8	3,600

(iii) Find an expression that relates v and;, and explain why it represents linear decay.
Solution:
The value v after t years can be expressed as: v(t)= 10000 – 800;
This expression represents linear decay because the value v decreases by a constant amount (₹ 800) for each unit increase in time (years).

Q 3.The initial population of a village is 750. Every year, 50 people move from a nearby city to the village.
(i) Find the population of the village after 6 years.
Solution:
Initial population of village = 750
Population increase per year = 50
∴ Population after 6 years = Initial population + (Increase per year × 6)
⇒ Population (P) = 750 + (50 × 6)
= 750 + 300
= 1050
(ii) Make a table of values for t varying from 0 to 10 years and show how the population, P, increases every year.
Solution:

Time (years)	Population (P)
0	750
1	800
2	850
3	900
4	950
5	1,000
6	1,050
7	1,100
8	1,150
9	1.200
10	1,250

(iii) Find an expression that relates P and t, and explain why it represents linear growth.
Solution:The population P after t years can be expressed as: P(t) = 750 + 50t
This expression represents linear growth because the population increases by a constant number (50 people) every year.
Q 4.A telecom company charges ₹ 600 for a certain recharge scheme. This prepaid balance is reduced by ? 15 each day after the recharge.
(i) Write an equation that models the remaining balance b(x) after using the scheme forx days. Explain why it represents linear decay.
Solution:Initial balance = ₹ 600
Reduction per day = ₹ 15
∴ Remaining balance after x days can be expressed as: b(x) = 600 – 15x
This expression represents linear decay because the balance decreases by a constant amount (₹ 15) each day.
(ii) After how many days will the balance run out?
Solution:To find the number of days after which the balance will runs out, set b(x) = 0.
⇒ 600 – 15x = 0
⇒ 15x = 600
⇒ x = 40
Therefore, the balance will ran out after 40 days.
(iii) Make a table of values for x varying from 1 to 10 days and show how the balance b(x), reduces with time.
Solution:

Days (x)	Remaining Balance b(x) (₹)
1	585
2	570
3	555
4	540
5	525
6	510

7	495
8	480
9	465
10	450

Exercise 2.5 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.5 Solutions

Question 1.

A learning platform charges a fixed monthly fee and an additional cost per digital learning module accessed. A student observes that when she accessed 10 modules, her bill was ?400. When she accessed 14 modules, her bill was ?500. If the monthly bill y depends on the number of modules accessed, x, according to the relation y = ax + b, find the values of a and b.

Solution:Given the linear relation y = ax + b, where y is the monthly bill and x is the number of modules accessed:

When x = 10, y = 400,

and when x = 14, y = 500

We now have two equations:

400= 10a + b …(i)

500 = 14a + b ………. (ii)

To solve for a and b, subtract the first equation from the second one:

500 – 400 = (14a + b) – (10a + b)

⇒ 100 = 4a

⇒ a = 25

Substitute a = 25 equation (i):

400= 10(25) + b

⇒ 400 = 250 + b

⇒ b = 150

Thus, the equation for the monthly bill is y = 25x + 150, and a = 25 and 6 = 150.

Question 2.A gym charges a fixed monthly fee and an additional cost per hour for using the badminton court. A student using the gym observed that when she used the badminton court for 10 hours, her bill was ₹ 800. When she used it for 15 hours, her bill was ₹ 1100. If the monthly billy depends on the hours of the use of the badminton court, x, according to the relation y = ax + b, find the values of a and b.

Solution:

Given the linear relation y = ax + b, wherey is the monthly bill and x is the number of hours:

When x = 10 , y = 800, and when x = 15 ,y = 1100 We now have two equations:

800= 10a + b … (i)

1100= 15a + b …(ii)

Subtract the first equation from the second one:

1100-800= (15a+ 6)-(10a+ 6)

⇒ 300 = 5a

⇒ a = 60

Substitute a = 60 in first equation:

800= 10(60) + b

⇒ 800 = 600 + 6

⇒ b = 200

Thus, the equation for the gym’s monthly bill is

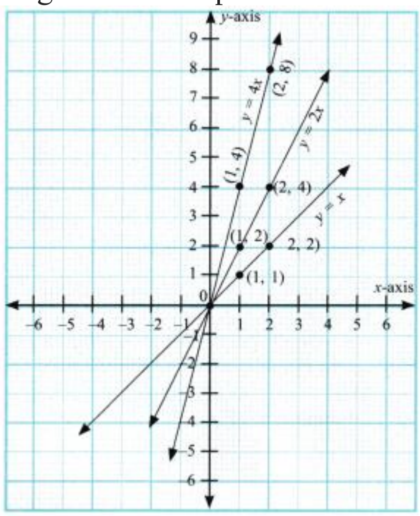
y = 60x + 200, and a = 60 and b = 200.

Q 3.Consider the relationship between temperature measured in degrees Celsius (°C) and degrees Fahrenheit (°F), which is given by °C = a °F + b. Find a and b, given that

ice melts at 0 degrees Celsius and 32 degrees Fahrenheit, and water boils at 100 degrees Celsius and 212 degrees Fahrenheit. (Hint: When °C = 0, °F = 32 and when °C = 100, °F = 212. Use this information to find a and b, and thus, the linear relationship between °C and °F.)
Solution:Given the linear relation °C = a °F + b, where the temperatures for melting ice and boiling water are:
When °C = 0, °F = 32 and
when °C = 100, °F = 212
We now have two equations:
0 = a(32) + b …(i)
100 = a(212) + b …(ii)
From equation (i) b = -32a
Substitute b = -32a into the equation (ii):
100 = 212a – 32a
⇒ 100 = 180a
⇒ a = 100180=59
Substitute a = 59 in b = -32a
b = -32 × 59=−1609
Thus, the relationship between Celsius and Fahrenheit is:
°C = 59°F – 1609 and a = 59 and b = −1609

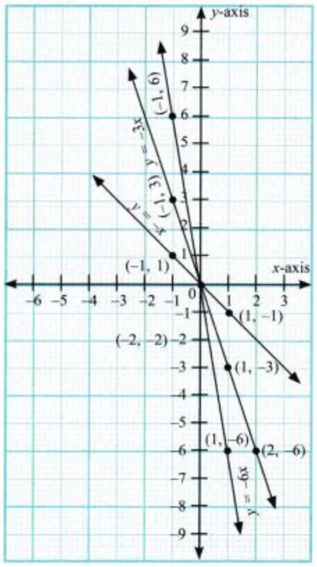
Exercise 2.6 Class 9 Ganita Manjari Solutions – Ganita Manjari Class 9 Ex 2.6 Solutions

Question 1.Draw the graphs of the following sets of lines. In each case, reflect on the role of ‘a’ and ‘6’.(i) y = 4x,y = 2x,y = x
Solution:y = 4x, y = 2x, y = x
All lines are of the form y = ax (b = 0).
Observation:
All lines pass through the origin (0, 0).
The value of ‘a’ (slope) determines steepness.
Larger ‘a’ ⇒ steeper line.



(ii) y = – 6x, y = – 3x, y = – x
Solution:y = – 6x, y = -3x, y =-x
All lines are of the form y = -ax (b = 0).
Observation:
All lines pass through the origin.
Negative ‘a’ means lines slope downward.

Larger magnitude of‘a’ ⇒ steeper downward slope.

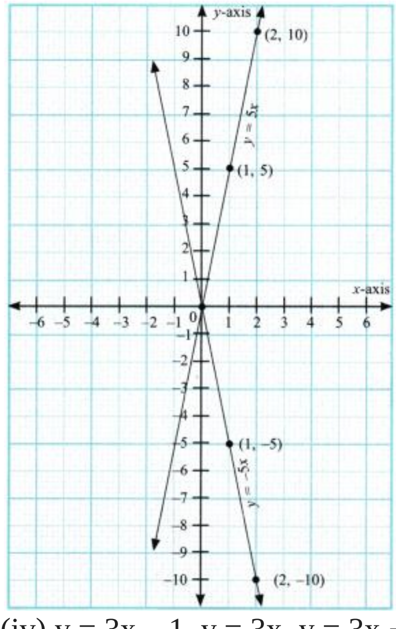


(iii) y = 5x, y = -5x

Solution:y = 5x, y = -5x

All lines are of the form y = ax (b = 0).

Observation: Here, both lines pass through the origin because the y-intercept is 0. y = 5x slopes upward, y = -5x slopes downward, same magnitude of a, same steepness but in opposite directions.



(iv) y = 3x – 1, y = 3x, y = 3x + 1

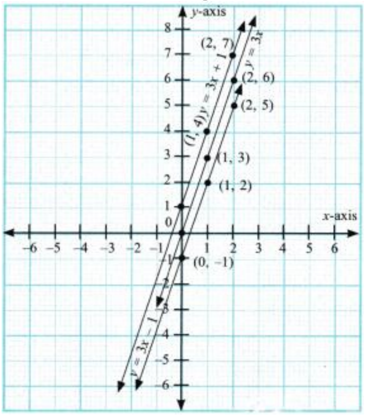
Solution:y = 3x – 1, y = 3x, y = 3x + 1

All lines have same slope (a = 3).

Observation: Lines are parallel as slopes are the same (3).

Different values of ‘b’ shift the line. b = -1 line below origin, b = 0 passes through origin b =

1 line above origin.



(v) y = -2x – 3, y = -2x, y = 2x + 3

Solution:

y = -2x -3 ,y = -2x, y = 2x + 3

Observation:

y = -2x – 3 and y = -2x have the same slope (-2), so the lines are parallel lines. y = 2x + 3 has positive slope and represents different direction.

‘b’ changes vertical position of the line.

Conclusion:

1. a (coefficient of x) controls slope (steepness and direction).

2. b (constant term) controls vertical shift (y-intercept).