NEET

2027

Introduction to Linear Polynomials

Lecture-6

CLASS-9TH | MATHS

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Topics To Be Covered

1. Linear Relationship

Introduction to Linear Polynomials

Lecture - 6

QUESTIONS

Solve-

$x + y = 10$

$x - y = 2$

$$x + y = 10$$
$$x - y = 2$$
$$\oplus \quad \ominus \quad =$$
$$2x = 12$$

$$x = \frac{12}{2}$$

$$\boxed{x = 6}$$

$$x + y = 10$$
$$6 + y = 10$$

$$\boxed{y = 4}$$

QUESTIONS

Solve-

$2a + b = 11$

$a + b = 7$

$2a + b = 11$

$a + b = 7$

$(-)\quad (-)\quad (-)\quad (-)$

$a = 4$

$a + b = 7$

$4 + b = 7$

$b = 3$

QUESTIONS

Solut

$4a + b = 30$

$2a + b = 18$

(−) (−) (−)

(−)

$2a = 12$

$a = 6$

$4a + b = 30$

$4(6) + b = 30$

$24 + b = 30$

$b = 6$

QUESTIONS

Solu :

$2x + y = 20$

$x - y = 1$

(+)

$3x = 21$

$x = 7$

$x - y = 1$

$7 - y = 1$

$6 = y$

QUESTIONS

Solut

$3x + y = 23$

$x + y = 11$

$2x = 12$

$x = 6$

$x + y = 11$

$6 + y = 11$

$y = 5$

Linear Relationship

A linear relationship is a relationship between two quantities where:

- one quantity changes when the other changes, and
- the change happens at a constant rate.

QUESTIONS

A village has a population of 750 people.

Every year, 50 new people move into the village.

Observation

- As years increase, population increases.
- Population increases by the same amount (+50) every year.

Relationship

P=750 + 50t

Years(t)	Population(P)
0	750
1	800
2	850
3	900
4	950

QUESTIONS

A student has a prepaid balance of ₹600.

Every day, ₹15 is used.

Observation

- As days increase, balance decreases.
- Balance decreases by the same amount (₹15) every day.

Relationship

$b(x) = 600 - 15x$

Days(x)	Balance(₹)
0	600
1	585
2	570
3	555
4	540

REVISION

Last Lecture:

$P=750 + 50t$

Population after t years

$V= 10000 - 800t$

Value of phone after t years

$b(x)=600-15x$

Recharge balance after x days

linear relationship

Constant rate → increase / decrease.

QUESTIONS

PIZZA DELIVERY

A pizza app charges:

- ₹100 delivery fee
- ₹50 per pizza

Total cost = 100 + 50 (no. of pizzas)

y = $100 + 50x$

Pizzas	Bill
1	150
2	200
3	250
4	300

Question

Can we find a rule?

GAMING ZONE

A gaming zone charges:

- ₹200 entry fee
- ₹30 per game

Find the rule.

$y = 200 + 30x$

y → Total cost.

x → no. of games.

Games	Cost
1	230
2	260
3	290
4	320

A PATTERN EMERGES

[redacted]

$y = 50x + 100$

$y = 30x + 200$

All these rules have the form:

$y = ax + b$

This is called a LINEAR RELATIONSHIP.

WHAT IF THE RULE IS HIDDEN?

Suppose a gaming zone does not tell us:

- Entry fee
- Cost per game

We only know:

10 games -> ₹500

20 games -> ₹800

Can we still find the rule?

$y = ax + b$

Total cost

no. of games

Ans: $y = 30x + 200$

$500 = 10(30) + b$

$200 = b$

$500 = 10a + b$

$800 = 20a + b$

$-300 = -10a$

$\frac{+300}{+10} = a$

$a = 30$

FIND THE RELATIONSHIP

$y = ax + b$

A trampoline park charges:

12 jumps -> ₹340

20 jumps -> ₹500

$340 = 12a + b$

$340 = 12(20) + b$

$340 = 240 + b$

$100 = b$ → Entry fee.

Find the relationship between:

Number of jumps x and total bill y

$y = ax + b$

y: total bill, x: no. of jumps.

$340 = 12a + b$

$-\ 500 = -\ 20a - b$

$-160 = -8a$

$20 = a$ → cost of each game.

$y = 20x + 100$

Ans:

1 → 20 RS.

Entry Fee → 100.

$100 + 20(1)$

$100 + 20(2)$

$100 + 20(3)$

total bill

$y = 100 + 20x$ (x → no. of pumps.)

FIND THE RELATIONSHIP

A food delivery service charges:

8 orders -> ₹460

12 orders -> ₹620

Find the relationship between:

Number of orders x and total bill y.

$y = ax + b$

total bill

no. of orders

$460 = 8a + b$

$620 = 12a + b$

$-160 = -4a$

$40 = a$

$460 = 8(40) + b$

$460 = 320 + b$

$140 = b$

Ans

$y = 40x + 140$

QUESTIONS

A learning platform charges a fixed monthly fee and an additional charge per digital learning module accessed.

A student notices that:

- 10 modules cost ₹400
- 14 modules cost ₹500

$400 = 10a + b$

$500 = 14a + b$

$-100 = -4a$

$25 = a$

$400 = 10(25) + b$

$150 = b$

If the monthly bill y depends on the number of modules according to

$$y = ax + b$$

find the values of a and b.

QUESTIONS

A gym charges a fixed membership fee and an hourly usage charge.

A customer observes:

- 10 hours cost ₹800
- 15 hours cost ₹1100

If y=ax+b

find a and b.

$800 = 10a + b$

$1100 = 15a + b$

$-300 = -5a$

$60 = a$

$800 = 10(60) + b$

$200 = b$

$y = ax + b$

y → total cost

a → cost of 1 hour

x → no. of hours usage.

b → Fixed membership fee.

TAXI SERVICE

A taxi company charges:

- A fixed booking fee
- A charge per kilometre

#GPK

A customer notices:

- 12 km costs ₹244
- 20 km costs ₹340

Find the relationship.

QUESTIONS

A movie theatre charges:

- A fixed booking fee
- A charge per ticket

#GPH

A customer observes:

- 5 tickets cost ₹350
- 9 tickets cost ₹550

Find the relationship between:

Number of tickets and Total bill

QUESTIONS

The temperature in Celsius and Fahrenheit are related by:

#GPU

$C = aF + b$

$0 = 32a + b$

$100 = 212a + b$

It is known that:

- Water freezes at 0° C and 32° F
- Water boils at 100° C and 212° F

Find the relationship between C and F.

Thank You !

- *Work Hard.*
- *Dream big.*
- *Never give up.*