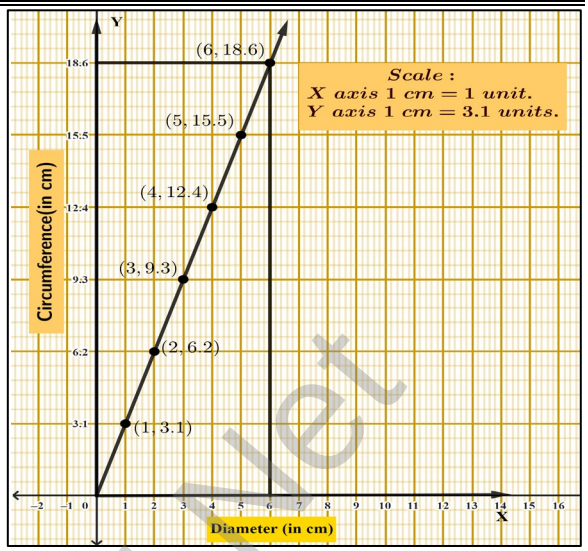
10TH MATHS GRAPH OF VARIATION(FOR SLOW LEARNERS)

GRAPH OF DIRECT VARIATION (KEY POINT) EM NEW (2024 - 2025)

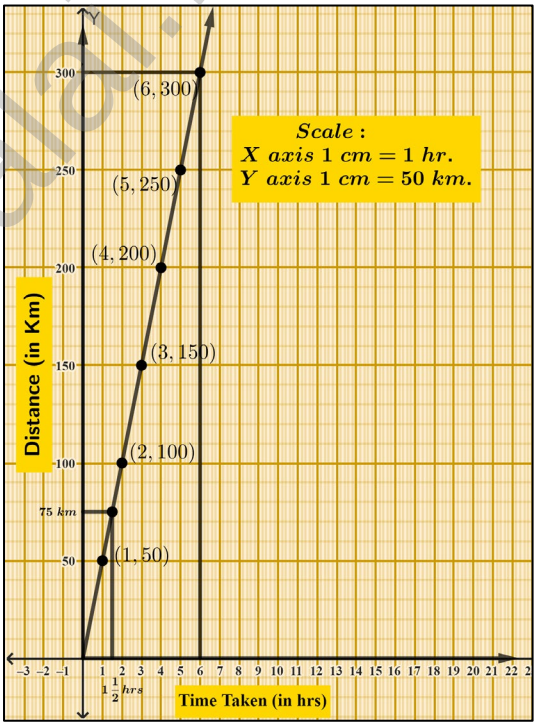
1. Varshika Sum. [**Example: 3.47**]



Solution:

- ✓ $x \uparrow$ **increases** $y \uparrow$ **increases**. **Direct variation**.
- ✓ $y = kx$, $k = \frac{y}{x}$ (Direct for Divide)
- ✓ $k = \frac{3.1}{1} = \frac{6.2}{2} = \frac{9.3}{3} = \frac{12.4}{4} = \cdots = 3.1$. $k = 3.1$
- ✓ Points (1, 3.1), (2, 6.2), (3, 9.3), (4, 12.4), (5, 15.5).
- ✓ ∴ Diameter = **6 cm**, Circumference = **18.6 cm**.

2. A bus Travelling Sum. [**Example: 3.48**]



Solution:

- ✓ x = time taken (in hrs) and y = distance (in km).

Time taken x (in hrs)	1	2	3	4
Distance y (in km)	50	100	150	200

- ✓ $x \uparrow$ **increases**, $y \uparrow$ **increases**. **Direct variation**.
- ✓ $y = kx$, $k = \frac{y}{x}$ (Direct For Divide)
- ✓ $k = \frac{50}{1} = \frac{100}{2} = \frac{150}{3} = \frac{200}{4} = \cdots = 5$. $k = 5$
- ✓ Points (1, 50), (2, 100), (3, 150), (4, 200).
- ✓ ∴ Time= **90 minutes or 1 ½** hrs , Distance= **75 km**.
- ✓ ∴ Distance= **300 km** , Time= **360 minutes or 6** hrs.

3. A Garment Shop Sum [**Exercise : 3.15) 1)**]

Solution:

- ✓ x = Marked Price (in ₹) y = Discount (in ₹).

Marked Price x (in ₹)	1000	1500	2000	2500	3000
Discount y (in ₹)	500	750	1000	1250	1500

- ✓ $x \uparrow$ **increases** $y \uparrow$ also **increases**. **Direct variation**.
- ✓ $y = kx$, $k = \frac{y}{x}$,(Direct for Divide)
- ✓ $k = \frac{500}{1000} = \frac{750}{1500} = \frac{1000}{2000} = \frac{1250}{2500} = \cdots = \frac{1}{2}$. $k = \frac{1}{2}$
- ✓ Points (1000, 500), (1500, 750), (2000, 1000), (2500, 1250), (3000, 1500).
- ✓ ∴ Discount = **₹ 3250** , Marked price = **₹ 6500**.
- ✓ ∴ Marked price = **₹ 2500** , Discount = **₹ 1250**.

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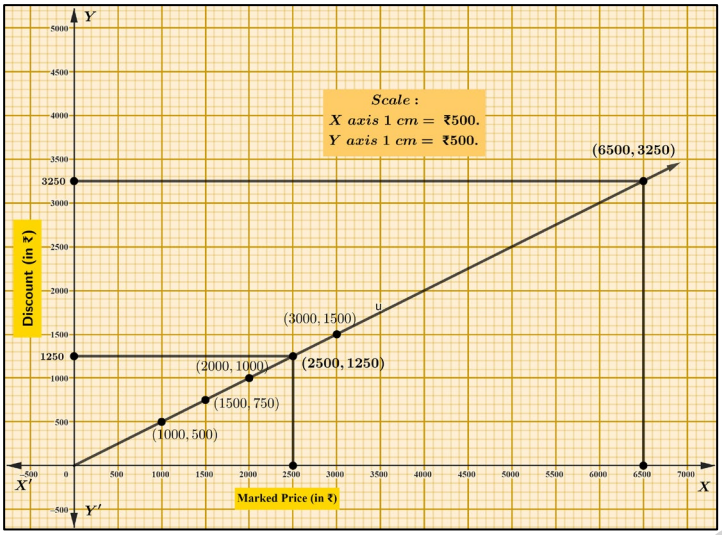

4. Graph the following linear function $y = \frac{1}{2}x$. [**Exercise: 3.15) 3)**]

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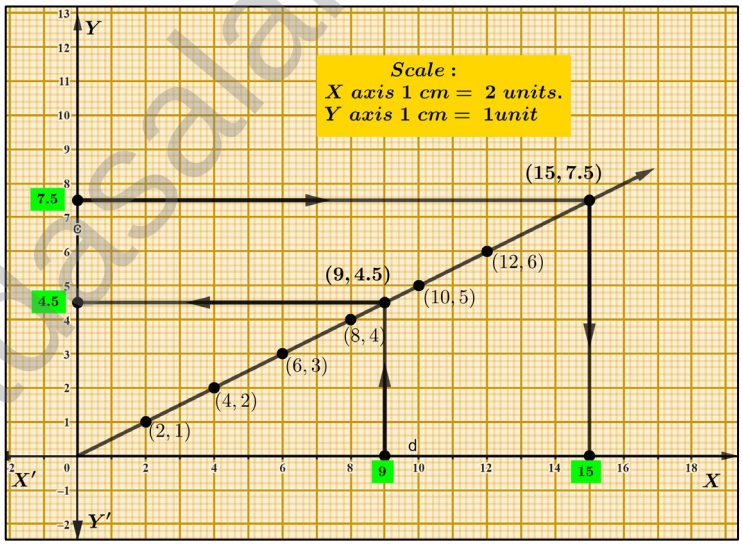
Solution: $y = \frac{1}{2}x$ (take **Even** number divisible by **2**)

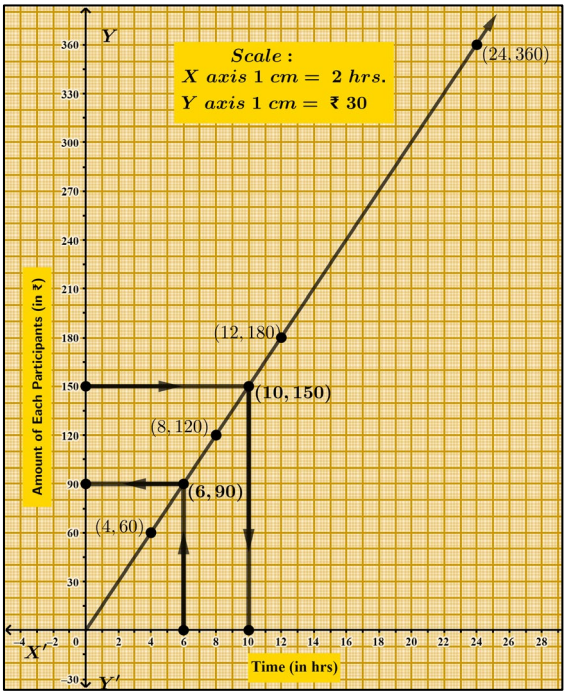
x	2	4	6	8	10	12
y	1	2	3	4	5	6



- ✓ $\boxed{x \uparrow}$ **increases** $y \uparrow$ also **increases**. **Direct variation**.
- ✓ $y = kx$, $\boxed{k = \frac{y}{x}}$, (Direct for divide)
- ✓ $k = \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \cdots = \frac{1}{2}$. $k = \frac{1}{2}$
- ✓ Points (2, 1), (4, 2), (6, 3), (8, 4), (10, 5), (12, 6).
- ✓ ∴ $\boxed{\text{when } x = 9, y = 4.5.}$
- ✓ ∴ $\boxed{\text{when } y = 7.5, x = 15.}$

5. A two wheeler Parking Sum **[Exercise: 3.15) 6)]**

Solution:



- ✓ $\boxed{x \uparrow}$ **increases** $\boxed{y \uparrow}$ also **increases**. **Direct variation**.
- ✓ $y = kx$, $\boxed{k = \frac{y}{x}}$,(Direct for Divide)
- ✓ $k = \frac{60}{4} = \frac{120}{8} = \frac{180}{12} = \frac{360}{24} = \cdots = 15$. $k = 15$
- ✓ Points (4, 60), (8, 120), (12, 9180), (24, 360).
- ✓ ∴ $\boxed{\text{when parking time} = \textbf{6 hrs} \text{ ,The amount} = \textbf{₹ 90}.}$
- ✓ ∴ $\boxed{\text{when The amount} = \textbf{₹ 150} \text{ ,}}$ $\boxed{\text{The parking Time} = \textbf{10 hrs}.}$

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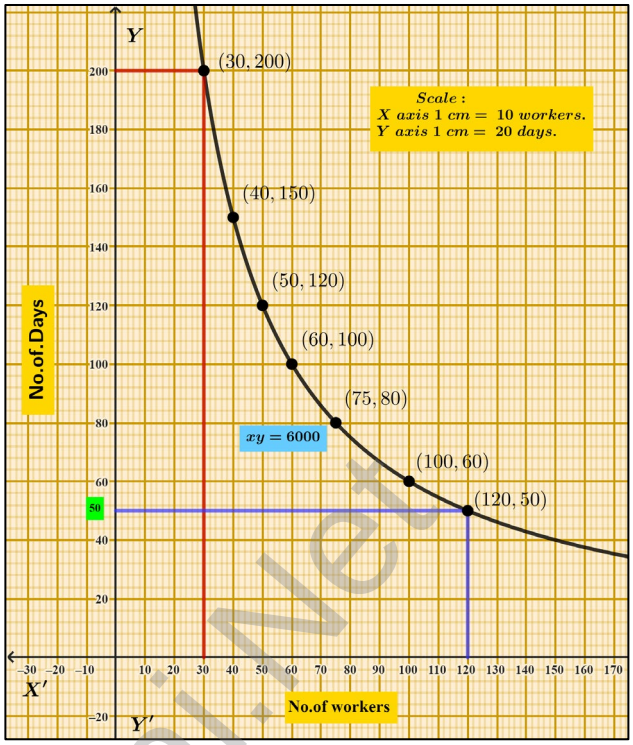
GRAPH OF INVERSE VARIATION (KEY POINT) EM NEW (2024 - 2025)

1. A Company Workers Sum [**Example: 3.49**]



Solution:

- ✓ $\boxed{x\uparrow}$ **increases,** $\boxed{y\downarrow}$ **decreases.**
  Inverse or Indirect variation.
- ✓ $y = \frac{k}{x}$, $\boxed{k = xy}$ **(Inverse for Int or Multiply)**
- ✓ $k = 40 \times 150 = 50 \times 120 = 60 \times 100 = 75 \times 80 = \cdots = \mathbf{6000}$. $k = \mathbf{6000}$
- ✓ Points (40, 150), (50, 120), (60, 100), (75, 80).
- ✓ ∴ The Workers= **120** , Days= **50 days**.
- ✓ ∴ Days= **200 days**, The Workers = **30**.

2. Nishanth Winner Sum [**Example: 3.50**]

Solution:

- ✓ x = Speed (in km / hr) , y = time (in hours).

Speed x (in km / hr)	12	6	4	3	2
Time y (in Hours)	1	2	3	4	6

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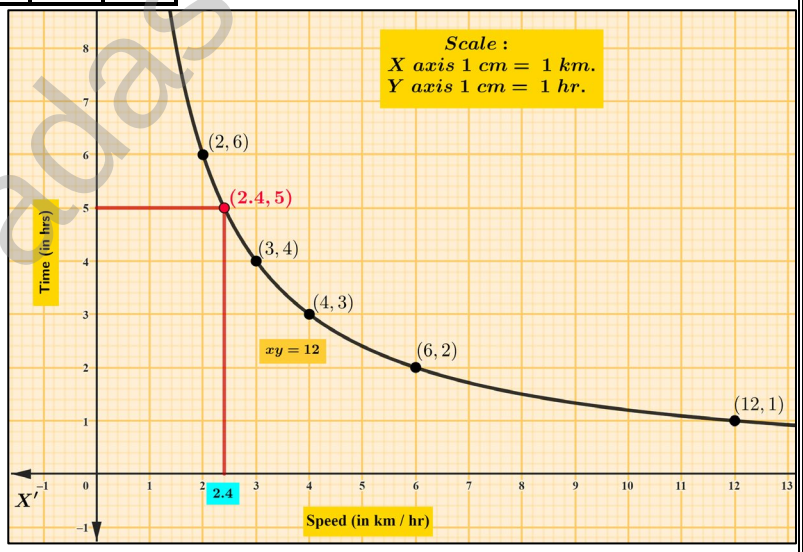
- ✓ $\boxed{x\downarrow}$ **decreases** , $\boxed{y\uparrow}$ **increases.**
  Inverse or indirect variation.
- ✓ $y = \frac{k}{x}$, $\boxed{k = xy}$, (Inverse for Int or Multiply)
- ✓ $k = 12 \times 1 = 6 \times 2 = 4 \times 3 = 3 \times 4 = \cdots = \mathbf{12}$. $k = \mathbf{12}$
- ✓ Points (12, 1), (6, 2), (4, 3), (3, 4), (2, 6).
- ✓ ∴ Time = **5 hrs** ,
  Speed = **2.4 km / hr**.



3. Draw $xy = 24, x, y > 0$. Sum [**Exercise: 3.15) 2)**]

Solution: $xy = 24$ (take multiple of **24** two point)

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x	1	2	3	4	6	8	12	24
y	24	12	8	6	4	3	2	1

- ✓ $\boxed{x\uparrow}$ **increases** and $\boxed{y\downarrow}$ **decreases.** **Inverse or Indirect variation.**
- ✓ $y = \frac{k}{x}$, $\boxed{k = xy}$,(Inverse for Int or Multiply)
- ✓ $k = 1 \times 24 = 2 \times 12 = 3 \times 8 = 4 \times 6 = \cdots = \mathbf{24}$. $k = \mathbf{24}$
- ✓ Points (1, 24), (2, 12), (3, 8), (4, 6), (6, 4), (8, 3), (12, 2), (24, 1).
- ✓ ∴ when $x = 3$, $y = 8$.
- ✓ ∴ when $y = 6$, $x = 4$.

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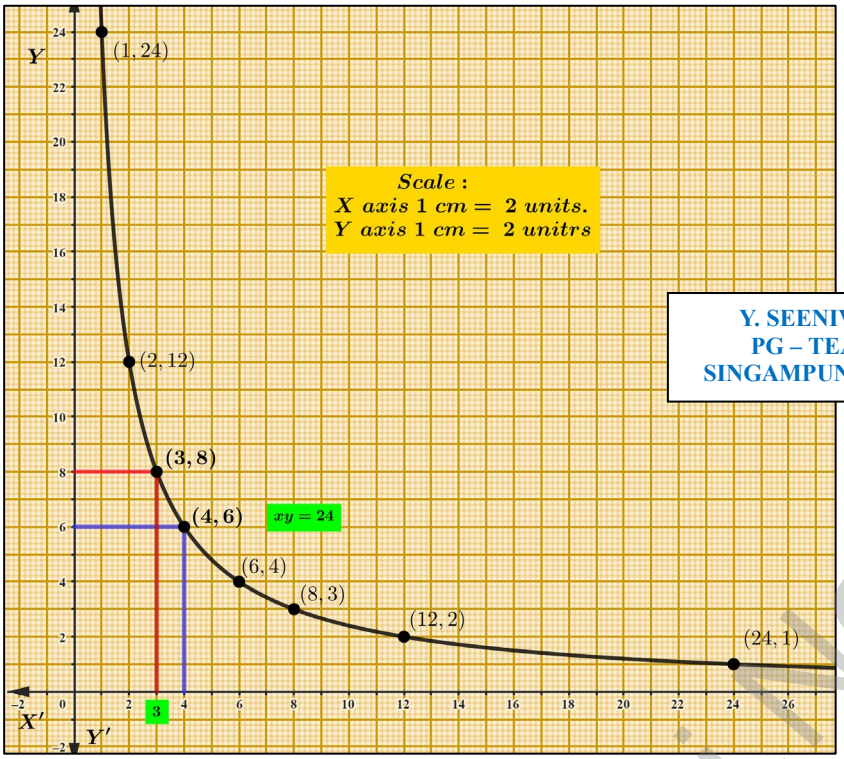

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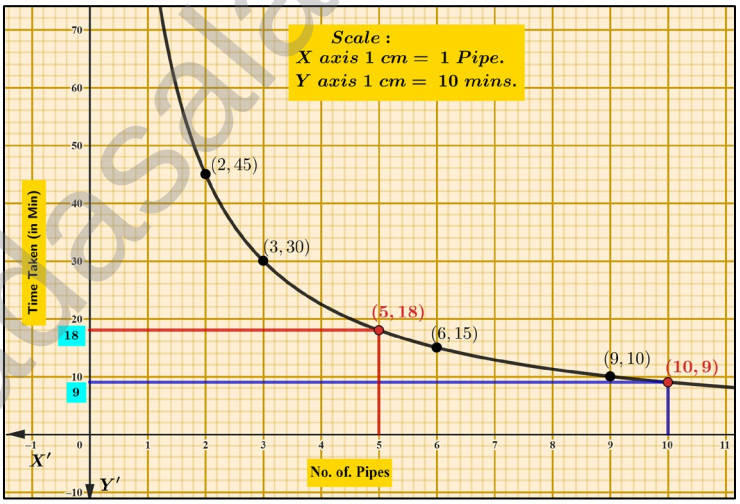
4. The number of pipes Sum. [**Exercise: 3.15) 4)**]

Solution:



- ✓ $\boxed{x\uparrow}$ **increases** $\boxed{y\downarrow}$ **decreases.**
  Inverse or Indirect variation.
- ✓ $y = \frac{k}{x}$, $\boxed{k = xy}$,(Inverse for Int or Multiply)
- ✓ $k = 2 \times 45 = 3 \times 30 = 6 \times 15 = 9 \times 10 = \cdots = \mathbf{90}$. $k = \mathbf{90}$
- ✓ Points (2, 45), (3, 30), (6, 15), (9, 4).
- ✓ ∴ $\boxed{\text{Pipes} = \mathbf{5\ pipes}}$,
  $\boxed{\text{Time taken} = \mathbf{18\ minutes}}$.
- ✓ ∴ $\boxed{\text{Time Taken} = \mathbf{9\ minutes}}$, Pipes $= \mathbf{10\ Pipes}$.

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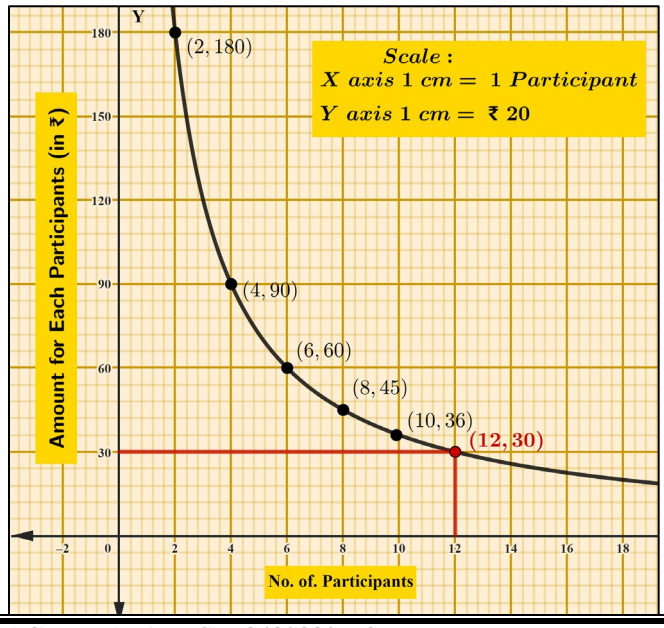
5. A School Competition Sum [**Exercise: 3.15) 5)**]

Solution:



- ✓ $\boxed{x\uparrow}$ **increases** $\boxed{y\downarrow}$ **decreases.**
  Inverse or Indirect variation.
- ✓ $y = \frac{k}{x}$, $\boxed{k = xy}$,(Inverse for Int or Multiply)
- ✓ $k = 2 \times 180 = 4 \times 90 = 6 \times 60 = 8 \times 45 = \cdots = \mathbf{360}$. $k = \mathbf{360}$
- ✓ Points (2, 180), (4, 90), (6, 60), (8, 45), (10, 36).
- ✓ ∴, $\boxed{\text{The number of participants} = \mathbf{12}}$,
  $\boxed{\text{Amount of each participants} = \mathbf{₹\ 30}}$.

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