**POINT OF INTERSECTION (POI)**

|  |
| --- |
| A group of lines studied together is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. To solve a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, we find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.This point is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**FINDING POI GRAPHICALLY**

A car rental agency offers two daily rental plans. Write the equation for each plan. (Let c be cost and k be km driven)

**Plan A:** $20 per day plus $0.25/km \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Plan B:** $10 per day plus $0.50/km \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graph each plan using the table of values

|  |  |
| --- | --- |
| **PLAN A**  | **PLAN B**  |
|  **k (km)** | **c ($)**  |  **k (km)** | **c ($)**  |
| **0** |  | **0** |  |
| **20** |  | **20** |  |
| **40** |  | **40** |  |
| **60** |  | **60** |  |

**Determine** the coordinates of POI (\_\_ , \_\_)

**CHECKING POI ALGEBRAICALLY**

We sometimes need to check if our solution is correct algebraically. This way we will prove that we graphed both lines correctly. If we know the “x” coordinate of a point, we substitute the numerical value of x for x into an equation to produce the “y” coordinate. Since **POI** is a shared point on both lines; therefore, when the x value plugged into both equations we must have the same y value.

**Write** the equations for both plans in the chart below and plug the x coordinate of POI in each equation. If LS = RS in both equations, we just proved that we graphed both lines correctly and our POI is verified.

|  |  |
| --- | --- |
| **PLAN A =**  | **PLAN B =**  |
| **LS** | **RS** | **LS** | **RS** |
|  |  |  |  |

**FINDING POI ALGEBRAICALLY**In the previous example we found out the following equations for each plan:

|  |  |
| --- | --- |
| **PLAN A** | **PLAN B** |
| **c = 0.25k + 20** | **c = 0.50k + 10** |

**Step 1: Determining the “x” coordinate of POI**

Graphically we found out that c values are the same at POI. Therefore, we can substitute the expression of c for c in plan A in plan B. It sounds complicated but algebraically this is how it looks:

**Step 2: Determining the “y” coordinate of POI**

**TRY**: Determine the POI of the following system algebraically and verify your answer using LS = RS in both equations.

Equation 1 🡪 y = 3x – 10 Equation 2 🡪 y = 5x - 18