Put into NSF \(5x^2 - 2y = 0\)

\[
x^2 = \frac{2}{5}y
\]

- Vertical parabola
- \(4p = \frac{2}{5} \Rightarrow p = \frac{1}{10}\)
- Directrix: \(y = -\frac{1}{10}\)
- \(F(0, \frac{1}{10})\)

**B**

**Std. Form.** \(V_2(12,0),\ F_1(-5,0)\)

**Solution:**

1. Ellipse (Horiz \(\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1\))

2. \(a = 12 \Rightarrow a^2 = 144\) and \(c = 5 \Rightarrow c^2 = 25\)

3. \(a^2 = b^2 + c^2 \Rightarrow 144 = b^2 + 25\)

4. \(b^2 = 119\)

4. The Eqn is \(\frac{x^2}{144} + \frac{y^2}{119} = 1\)

**II**


**A**

Review – 2eqs. in 2 unknowns.

1. Both Linear:

2. Example: \(x + 2y = 3\), \(2x - 5y = 6\)

3. "Solve simultaneously." "Find the point of intersection."

4. \(x + 2y = 3\)

5. \(2x - 5y = 6\)

6. -2x

7. \(-2x - 4y = -6\)

8. \(2x - 5y = 6\)

9. \(-9y = 0 \Rightarrow y = 0\)

10. \(x = 3\)

11. The pt. of intersection is \(P(3,0)\).
Example: §9.1: p. 642: # 25: Solve
\[
\begin{align*}
  x - 2y &= 2 \\
  y^2 - x^2 &= 2x + 4
\end{align*}
\]

\text{Solu:} \quad \text{Usual way is by subs}

1. Solve "easier" eq. for one var. \( y \); Subs into other eq.

   1. \( x = 2 + 2y \quad \rightarrow \quad y^2 - (2 + 2y)^2 = 2(2 + 2y) + 4 \)

   \quad \text{Simp.} \quad y^2 - 2^2(1 + y)^2 = 4 + 4y + 4 = 4y + 8

   \quad \therefore y^2 - 4(1 + 2y + y^2) = 4y + 8

   \quad \therefore y^2 - 4 - 8y - 4y^2 = 4y + 8

   \quad -3y^2 - 12y - 12 = 0

   \quad y^2 + 4y + 4 = 0

   \quad (y + 2)(y + 2) = 0 \quad (y + 2)^2 = 0

   \quad \therefore y = -2

2. Subs into (easier eq) \( x - 2y = 2 \)

   \quad x - 2(-2) = 2

   \quad x + 4 = 2

   \quad \therefore x = -2

3. Pt. of int. \( P(-2, -2) \)
Math is the "language of science."
Solving problems is the business of science and engineering.

This is the "flow-chart" for the "modeling" process.
You used to call them "word problems" or "story problems." Now we call them "models."
AFTER CLASS // To graph on Calculator

1. \[ \begin{align*}
    x - 2y &= 2 \\
    y^2 - x^2 &= 2x + 4
\end{align*} \]

2. \[ \begin{align*}
    x - 2y &= 2 \\
    y^2 &= x^2 + 2x + 4
\end{align*} \]

3. \[ \begin{align*}
    y &= \frac{x - 2}{2} \\
    y &= \pm \sqrt{x^2 + 2x + 4}
\end{align*} \] —— ON GRAPHING CALCULATOR ——

4. \[ y_1 = \frac{(x - 2)}{2} \]

\[ y_2 = \{1, -1\} \sqrt{(x^2 + 2x + 4)} \]