

14) $(x-3)^2 + y^2 = 10$ circle
 $x - 3y = 3$ line
 $x = 3y + 3$

$$(3y+3-3)^2 + y^2 = 10$$

$$(6, 1)$$

$$(0, -1)$$

$$(3y)^2 + y^2 = 10$$

$$9y^2 + y^2 = 10$$

$$\frac{10y^2}{10} = \frac{10}{10}$$

$$\sqrt{y^2} = \sqrt{1}$$

$$y = \pm 1$$

$$7) 2y = (x^2 + 6x + 5)^2$$

$$y = -2x^2 - 12x - 10$$

$$2y = 2x^2 + 12x + 10$$

$$3y = 0 + 0 + 0$$

$$\frac{3y}{3} = \frac{0}{3}$$

$$y = 0$$

$$0 = x^2 + 6x + 5$$

$$0 = (x+5)(x+1)$$

$$x = -5 \quad x = -1$$

$$(-5, 0)$$

$$(-1, 0)$$

~~(-1, 0)~~

$$8) \quad x^2 + y^2 = 20$$

$$\begin{matrix} -x^2 \\ -x^2 \end{matrix} \begin{matrix} y \\ = x^2 \end{matrix}$$

$$x^2 + y^2 = 20$$

$$\begin{matrix} -x^2 \\ -x^2 \end{matrix} \begin{matrix} y \\ = 0 \end{matrix}$$

$$y^2 + y = 20$$

$$y^2 + y - 20 = 0$$

$$(y+5)(y-4) = 0$$

$$y = -5 \quad y = 4$$

$$\sqrt{5} = \sqrt{x^2}$$

$$x = \pm \sqrt{-5} \text{ imaginary}$$

$$\sqrt{4} = \sqrt{x^2}$$

$$x = \pm 2$$

$$(2, 4)$$

$$(-2, 4)$$

Factor completely:

$$1. \ 24x^4 + 10x^3 - 4x^2$$

$$2. \ -6x^5 + 3x^3$$

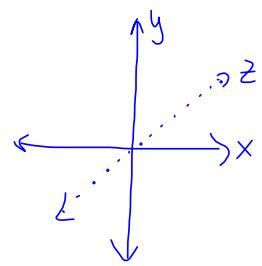
$$3. \ 15x^2 + 26x - 21$$

$$4. \ 27x^3 + 125$$

$$5. \ 8x^3 - 64y^3$$

What is an ordered pair? (x, y)

What is and an ordered triple? (x, y, z)



Solving System in 3 Variables

$$\begin{array}{l}
 4x + 2(1) + 3(-3) = 1 \\
 4x + 2y + 3z = 1 \\
 \cancel{2x - 3y + 5z = -14} \\
 6x - y + 4z = -1
 \end{array}
 \quad
 \begin{array}{l}
 4x - 7 = 1 \\
 \underline{+7 \quad +7} \\
 \frac{4x}{4} = \frac{8}{4} \\
 x = 2
 \end{array}$$

Eliminate x

$$\begin{array}{r}
 4x + 2y + 3z = 1 \\
 -4x + 6y - 10z = 28 \\
 \hline
 \end{array}$$

$$\star 8y - 7z = 29$$

$$\begin{array}{r}
 -6x + 9y - 15z = 42 \\
 6x - y + 4z = -1 \\
 \hline
 \end{array}$$

$$\star 8y - 11z = 41$$

$$\begin{array}{r}
 8y - 7z = 29 \\
 -8y + 11z = 41 \\
 \hline
 4z = -12 \\
 \frac{4z}{4} = \frac{-12}{4} \\
 z = -3
 \end{array}$$

Which Variable
would be the
easiest eliminate?

Eliminate Variable to form
2 new equations with the
same 2 variables.

$8y - 7(-3) = 29$
 $8y + 21 = 29$
 $\underline{-21 \quad -21}$
 $\frac{8y}{8} = \frac{8}{4}$
 $y = 1$

Then use the elimination
process we used when we
only had 2 variables.

Plug in both answers to find
3rd variable

$$(2, 1, -3)$$

Practice:

$$\begin{array}{l} 7. \quad 4x - y + 3z = 13 \\ \boxed{-x + y + z = 2} \\ \boxed{x + 3y - 2z = -17} \end{array}$$

Eliminate y

$$4x - y + 3z = 13$$

$$x + y + z = 2$$

$$(2) \quad \cancel{5x + 4z = 15}$$

$$5x + 4(5) = 15$$

$$5x = -5$$

$$x = -1$$

$$\begin{array}{r} 10x + 8z = 30 \\ -10x - 25z = -115 \\ \hline -17z = -85 \\ \hline -17 \end{array}$$

$$z = 5$$

$$\begin{array}{r} x + 3y - 2z = -17 \\ -3x - 3y - 3z = -6 \\ \hline -2x - 5z = -23 \end{array}$$

$$(5) \quad \cancel{-2x - 5z = -23}$$

$$(-1, 2, 5)$$

8. $-3x + y - z = -2 >$
 $(2) \quad 2x - y - 2z = -12 >$
 $\boxed{4x + 2y + z = 1}$

$4(-1) + 2y + 5 = 1$

$$\begin{array}{r} 2y + 1 = 1 \\ -1 -1 \\ \hline 2y = 0 \\ y = 0 \end{array}$$

Eliminate y

$$\begin{array}{r} -3x + y - z = -2 \\ 2x - y - 2z = -12 \\ \hline -1x - 3z = -14 \times \end{array}$$

$$\begin{array}{r} 4x - 2y - 4z = -24 \\ 4x + 2y + z = 1 \\ \hline \end{array}$$

$$\begin{array}{r} 8(-1) - 3z = -23 \\ +8 \\ \hline 8x - 3z = -23 \times (-1) \\ -3z = -15 \end{array}$$

$$\begin{array}{r} z = 5 \\ -1x - 3z = -14 \\ -8x + 3z = 23 \\ \hline -9x = 9 \end{array}$$

$x = -1$

$(-1, 0, 5)$

$$9. \begin{cases} 2x + y - z = -1 \\ x + 2y + 2z = 10 \\ * 2x + z = 3 \end{cases}$$

eliminate y

$$\begin{array}{r} -4x - 2y + 2z = 2 \\ x + 2y + 2z = 10 \\ \hline \end{array}$$

$$* -3x + 4z = 12$$

$$-4(2x + z) = (3) - 4$$

$$-3x + 4z = 12$$

$$-8x - 4z = -12$$

$$\begin{array}{r} -11x = 0 \\ \hline -11 \end{array}$$

$$x = 0$$

$$(0, 2, 3)$$

$$\begin{aligned}10. \quad & 7x + y = 8 \\& y - 7z = 50 \\& \cancel{\star} 8x + 8z = -48\end{aligned}$$

$$\begin{array}{r}7x + y = 8 \\ -y + 7z = 50 \\ \hline \cancel{\star} 7x + 7z = -42\end{array}$$

$$\begin{aligned}8x + 8z &= -48 \\7x + 7z &= -42\end{aligned}$$

$$\begin{array}{r}x + z = -6 \\-x + z = +6 \\ \hline 0 + 0 = 0 \\ \text{infinite}\end{array}$$

$$\begin{array}{l}
 11. \quad x + \frac{22}{5}y - 5z = -5 \\
 \quad y - 2z = 14 \\
 \quad 4y + 2z = 8
 \end{array}
 \qquad
 \begin{array}{l}
 x + \frac{14}{5}y = -5 \\
 \frac{22}{5}y - 2z = 14 \\
 -\frac{22}{5}
 \end{array}$$

$$\frac{5y}{5} = \frac{22}{5}$$

$$y = \frac{22}{5}$$

$$-2z \approx 9.6$$

$$z = -4\frac{4}{5} = -\frac{24}{5}$$

$$\left(-\frac{167}{5}, \frac{22}{5}, -\frac{24}{5} \right)$$