$$\frac{30+3x-6x^2}{6x^2-9x-15} = \frac{-3(-10-x+2x^2)}{3(2x^2-3x-5)} =$$

①

$$= -\frac{2x^2-x-10}{2x^2-3x-5} = -\frac{2\left(x-\frac{5}{2}\right)(x+2)}{2\left(x-\frac{5}{2}\right)(x+1)} = -\frac{x+2}{x+1}$$

②

① $2x^2-x-10=0$

$$x = \frac{1\pm\sqrt{1+80}}{4} = \begin{cases} -2 \\ \frac{5}{2} \end{cases}$$

② $2x^2-3x-5=0$

$$x = \frac{3\pm\sqrt{9+40}}{4} = \begin{cases} -1 \\ \frac{5}{2} \end{cases}$$

C.E.

$x \neq \frac{5}{2}$

$x \neq -1$

N 387

$$\frac{a^2-3a-4}{2a^2-11a+12} = \frac{(a-4)(a+1)}{(2a-3)(a-4)} = \frac{a+1}{2a-3}$$

RUFFINI

$$
\begin{array}{c|cc|c}
 & 2 & -11 & 12 \\
4 & & 8 & -12 \\
\hline
 & 2 & -3 & /\!/
\end{array}
$$

C.E.

$a \neq \dfrac{3}{2}$

$a \neq 4$

$$6x^3 + 5x^2 - 4x = 0$$

$$x(6x^2 + 5x - 4) = 0$$

$$x = 0$$

$$6x^2 + 5x - 4 = 0$$

$$\triangle = 25 + 96 = 121$$

$$x = \frac{-5 \pm 11}{12} = \begin{cases} \frac{1}{2} \\ -\frac{4}{3} \end{cases}$$

$$\boxed{x = 0 \ \lor \ x = \frac{1}{2} \ \lor \ x = -\frac{4}{3}}$$

$$3x^2 - 18x + 2x^3 - 27 = 0$$

(with annotations: -9 over $-18x$ and -27, x^2 under $3x^2$ and $2x^3$)

$$x^2(3 + 2x) - 9(2x + 3) = 0$$
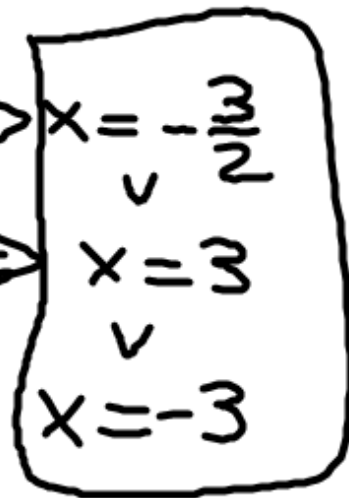
$$(2x + 3)(x^2 - 9) = 0$$

$$(2x + 3)(x - 3)(x + 3) = 0$$

$$2\left(x + \frac{3}{2}\right)(x - 3)(x + 3) = 0$$

$2x + 3 = 0 \Rightarrow x = -\frac{3}{2}$

$x - 3 = 0 \Rightarrow x = 3$

$x + 3 = 0 \Rightarrow x = -3$

$$x^3 - 2x^2 - x + 2 = 0$$

$$x(x^2 - 1) - 2(x^2 - 1) = 0$$

$$(x^2 - 1)(x - 2) = 0$$

$$(x - 1)(x + 1)(x - 2) = 0 \rightarrow$$

$$x - 1 = 0 \quad x = 1$$

$$x + 1 = 0 \quad x = -1$$

$$x - 2 = 0 \quad x = 2$$

N469

$$2x^3 - 3x^2 - 23x + 12 = 0$$

$$\pm 1 \quad \pm 3$$
$$\pm 2 \quad \pm 4$$
$$\pm 6 \quad \pm 12$$

$1 \rightarrow \quad 2 - 3 - 23 + 12 \neq 0$

$-1 \rightarrow \quad -2 - 3 + 23 + 12 \neq 0$

$2 \rightarrow \quad 16 - \cancel{12} - 46 + \cancel{12} \neq 0$

$-2 \rightarrow \quad -16 - 12 + 46 + 12 \neq 0$

$3 \rightarrow \quad 54 - 27 - 69 + 12 \neq 0$

$\boxed{-3} \rightarrow \quad -54 - 27 + 69 + 12 = 0$

YEAH!

$$(2x^2 - 9x + 4)(x + 3) = 0$$

$$\downarrow$$

$$2x^2 - 9x + 4 = 0$$

$$\Delta = 81 - 32 = 49$$

$$x = \frac{9 \pm 7}{4} = \begin{cases} \frac{1}{2} \\ \\ 4 \end{cases}$$

	2	-3	-23	12
-3		-6	27	-12
	2	-9	4	0

$$x = -3 \ \lor \ x = 4 \ \lor \ x = \frac{1}{2}$$

N 484

$$\begin{cases} x^2+y=-8 \\ \\ 2x+y=-7 \end{cases}$$

$$\begin{cases} y=\boxed{-8-x^2} \\ \\ 2x-8-x^2=-7 \end{cases}$$

$-x^2+2x-1=0$

$x^2-2x+1=0$

$\Delta=0$

$x=\dfrac{2}{2}=1$

$$\begin{cases} x=1 \\ \\ y=-8-1=-9 \end{cases}$$

$$\begin{cases} x=1 \\ \\ y=-9 \end{cases}$$

$(1,-9)$

$$\begin{cases} x - y + 2 = 0 \\ x^2 - y^2 + xy + 4 = 0 \end{cases}$$

$$\begin{cases} x = y - 2 \\ (y-2)^2 - y^2 + (y-2)y + 4 = 0 \end{cases}$$

$$y^2 + 4 - 4y - \cancel{y^2} + \cancel{y^2} - 2y + 4 = 0$$

$$y^2 - 6y + 8 = 0$$

$$\frac{\triangle}{4} = 9 - 8 = 1$$

$$y = 3 \pm 1 = \begin{cases} 4 \\ 2 \end{cases}$$

$$\begin{cases} x = 4 - 2 = 2 \\ y = 4 \end{cases} \quad \vee \quad \begin{cases} x = 2 - 2 = 0 \\ y = 2 \end{cases}$$

$$\boxed{(2, 4) \ \vee \ (0, 2)}$$