

1) a) $2a + 2b = 2(a+b)$

b) $h \cdot x^2$

c) $a \cdot (b+c) = ab + ac$

d) $\log_a b = c$

2) $P(x) - Q(x) = 2x - 1 - (-2x^2 + 3x - 5) = 2x - 1 + 2x^2 - 3x + 5 = 2x^2 - x + 4$

$$P(x) \cdot Q(x) = (2x - 1) \cdot (-2x^2 + 3x - 5) = -4x^2 + 6x^2 - 10x + 2x^2 - 3x + 5 = -13x + 5$$

3) a) $(3 - 4xy)^2 = 9 - 24xy + 16x^2y^2$

b) $(-b + 7x^2)^2 = (7x^2 - b)^2 = 49x^4 - 14x^2b + b^2$

c) $(3a + 2\sqrt{b})^2 = 9a^2 + 12a\sqrt{b} + 4b$

d) $(3x^2 - 4y)(3x^2 + 4y) = 9x^4 - 16y^2$

4) a) $9x^2 + 12x + 4 = (3x + 2)^2$

b) $4x^2 - 20xy + 25y^2 = (2x - 5y)^2$

c) $4a^2 - 36b^2 = (2a - 6b)^2$

5) a) $16x^3 + 24x^2 = 4x^2 \cdot (4x + 6)$

b) $3xy^3 - 27x^3y^2 = 3xy^2 \cdot (y - 9x^2)$

c) $-3x^2\epsilon^2 - 6x\epsilon^3 - 9x^2\epsilon^4 = -3x\epsilon^2(x + 2\epsilon + 3x\epsilon^2)$

d) $4xy^5 - 2y^2\epsilon + x^2\epsilon y^2 = y^2(4xy^3 - 2\epsilon + x^2\epsilon)$

6) a) $(x^3 + 4x + 6) : (x - 4)$

4	1	0	4	6
		4	16	80
	1	4	20	86

$x^2 + 4x + 20$ Cociente

Resto 86

b) $(x^3 - 2x^2 + 4) : (x + 3)$

-3	1	-2	0	4
		-3	+15	-45
	1	-5	15	-41

$x^2 - 5x + 15$ Cociente

-41 Resto

c) $(5x^4 - 3x^2) : (x-2)$

Cociente $5x^3 + 10x^2 + 17x + 34$

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$$\begin{array}{r|rrrrr} & 5 & 0 & -3 & 0 & 0 \\ 2 & & 10 & 20 & 34 & 68 \\ \hline & 5 & 10 & 17 & 34 & \underline{68} \end{array}$$

d) $(x^2 + 2) : (x + 4)$

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Cociente $x - 4$

$$\begin{array}{r|rrr} & 1 & 0 & 2 \\ -4 & & -4 & 16 \\ \hline & 1 & -4 & \underline{18} \end{array}$$

7) $P(-1) = -(-1)^5 + 2 \cdot (-1)^4 + 3 \cdot (-1)^3 - 3 \cdot (-1)^2 + 10 \cdot (-1) - 1 = 1 + 2 - 3 - 3 - 10 - 1 = -14$

8) a) $x^2 - 9 = (x-3)(x+3)$

b) $2x^2 - 4x = 2x(x-2)$

c) $2x^2 + 2x - 4 = 2 \cdot (x^2 + x - 2) = 2 \cdot (x+2)(x-1)$

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

$$x = \frac{-1 \pm \sqrt{1 - 4 \cdot 1 \cdot (-2)}}{2 \cdot 1} = \frac{-1 \pm \sqrt{9}}{2} = \frac{-1 \pm 3}{2} \rightarrow \begin{array}{l} x = \frac{-1-3}{2} = -2 \\ x = \frac{-1+3}{2} = 1 \end{array}$$

d) $-x^2 + 4x - 4 = -(x^2 - 4x + 4) = -(x-2)^2$

e) $x^2 + x + 2 \Rightarrow$ No se puede factorizar

$$x^2 + x + 2 = 0$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot 2}}{2 \cdot 1} = \frac{-1 \pm \sqrt{-7}}{2} \quad \nexists$$

f) $-2x^2 + x + 6 = -(2x^2 - x - 6) = -(x-2) \cdot (2x+3)$

$$2x^2 - x - 6 = 0$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot 2 \cdot (-6)}}{2 \cdot 2} = \frac{1 \pm \sqrt{49}}{4} = \frac{1 \pm 7}{4} \rightarrow \begin{array}{l} x = 2 \\ x = -\frac{3}{2} \end{array}$$

9) a) $4x^2 - 4x - 3 = (2x - 3) \cdot (2x + 1)$

$$4x^2 - 4x - 3 = 0$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 4 \cdot (-3)}}{2 \cdot 4} = \frac{4 \pm \sqrt{64}}{8} = \frac{4 \pm 8}{8} \rightarrow \begin{matrix} x = \frac{3}{2} \\ x = -\frac{1}{2} \end{matrix}$$

b) $x^4 + 2x^2 - 3 = (x-1) \cdot (x+1) \cdot (x^2+3)$

$$\begin{array}{r|rrrrr} & 1 & 0 & 2 & 0 & -3 \\ 1 & & 1 & 1 & 3 & 3 \\ \hline & 1 & 1 & 3 & 3 & 0 \\ -1 & & -1 & 0 & -3 & \\ \hline & 1 & 0 & 3 & 0 & \end{array}$$

$$x^2 + 3 = 0 \Rightarrow x^2 = -3 \Rightarrow x^2 = \pm \sqrt{-3} \quad \nexists$$

c) $2x^3 + 8x^2 - 2x - 8 = 2(x^3 + 4x^2 - x - 4) = 2 \cdot (x-1)(x+1)(x+4)$

$$\begin{array}{r|rrrr} & 1 & 4 & -1 & -4 \\ 1 & & 1 & 5 & 4 \\ \hline & 1 & 5 & 4 & 0 \end{array}$$

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

$$x = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1} = \frac{-5 \pm \sqrt{9}}{2} = \frac{-5 \pm 3}{2} \rightarrow \begin{matrix} x = \frac{-5+3}{2} = -1 \\ x = \frac{-5-3}{2} = -4 \end{matrix}$$

d) $x^3 + 7x^2 - 49x - 55 = (x+1)(x+11)(x-5)$

$$\begin{array}{r|rrrr} & 1 & 7 & -49 & -55 \\ -1 & & -1 & -6 & 55 \\ \hline & 1 & 6 & -55 & 0 \end{array}$$

$$x^2 + 6x - 55 = 0$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4 \cdot 1 \cdot (-55)}}{2 \cdot 1} = \frac{-6 \pm \sqrt{256}}{2} = \frac{-6 \pm 16}{2} \rightarrow \begin{matrix} x = -11 \\ x = 5 \end{matrix}$$

$$e) 6x^3 + 5x^2 - 3x - 2 = (x+1) \cdot (3x-2) \cdot (2x+1)$$

$$\begin{array}{r|rrrr} & 6 & 5 & -3 & -2 \\ -1 & & -6 & 1 & +2 \\ \hline & 6 & -1 & -2 & 0 \end{array}$$

$$6x^2 - x - 2 = 0$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot 6 \cdot (-2)}}{2 \cdot 6} = \frac{1 \pm \sqrt{49}}{12} = \frac{1 \pm 7}{12} \begin{cases} x = \frac{1+7}{12} = \frac{2}{3} \\ x = \frac{1-7}{12} = -\frac{1}{2} \end{cases}$$

$$f) x^4 - 2x^3 - 8x^2 + 21x = x(x^3 - 2x^2 - 8x + 21) = x \cdot (x+3) \cdot (x^2 - 5x + 7)$$

$$\begin{array}{r|rrrr} & 1 & -2 & -8 & +21 \\ -3 & & -3 & 15 & -21 \\ \hline & 1 & -5 & 7 & 0 \end{array}$$

$$x^2 - 5x + 7 = 0$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \cdot 1 \cdot 7}}{2 \cdot 1} = \frac{5 \pm \sqrt{-3}}{2} \quad \text{No real solutions}$$

$$g) 2x^4 + 7x^3 + 8x^2 + 3x = x \cdot (2x^3 + 7x^2 + 8x + 3) = x \cdot (x+1) \cdot (x+1) \cdot (2x+3) = x \cdot (x+1)^2 \cdot (2x+3)$$

$$\begin{array}{r|rrrr} & 2 & 7 & 8 & 3 \\ -1 & & -2 & -5 & -3 \\ \hline & 2 & 5 & 3 & 0 \end{array}$$

$$2x^2 + 5x + 3 = 0$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 2 \cdot 3}}{2 \cdot 2} = \frac{-5 \pm \sqrt{1}}{4} = \frac{-5 \pm 1}{4} \begin{cases} x = -\frac{3}{2} \\ x = -1 \end{cases}$$

$$h) x^5 - x^4 - x^3 - 2x^2 = x^2 \cdot (x^3 - x^2 - x - 2) = x^2 \cdot (x-2) \cdot (x^2 + x + 1)$$

$$\begin{array}{r|rrrr} & 1 & -1 & -1 & -2 \\ 2 & & 2 & 2 & 2 \\ \hline & 1 & 1 & 1 & 0 \end{array}$$

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

$$x = \frac{-1 \pm \sqrt{1 - 4 \cdot 1 \cdot 1}}{2 \cdot 1} = \frac{-1 \pm \sqrt{-3}}{2} \quad \text{No real solutions}$$

$$i) 2x^4 + 11x^3 + 11x^2 - 15x - 9 = (x-1)(x+3)(2x+1)(x+3)$$

$$2x^2 + 7x + 3 = 0$$

	2	11	11	-15	-9
1		2	13	24	9
	2	13	24	9	0
-3		-6	-21	-9	
	2	7	3	0	

$$x = \frac{-7 \pm \sqrt{7^2 - 4 \cdot 2 \cdot 3}}{2 \cdot 2} = \frac{-7 \pm \sqrt{25}}{4} = \frac{-7 \pm 5}{4}$$

$$\rightarrow x = -3$$

$$\rightarrow x = -\frac{1}{2}$$

$$j) 4x^4 + 10x^2 = 2x^2 \cdot (2x^2 + 5)$$

$$2x^2 + 5 = 0 \Rightarrow 2x^2 = -5 \Rightarrow x^2 = -\frac{5}{2} \Rightarrow \text{no tiene solución}$$

$$k) 2x^3 - 10x^2 + 14x - 6 = 2(x^3 - 5x^2 + 7x - 3) = 2 \cdot (x-1) \cdot (x-1)(x-3) =$$

$$= 2 \cdot (x-1)^2 \cdot (x-3)$$

	1	-5	7	-3
1		1	-4	3
	1	-4	3	0

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 1 \cdot 3}}{2 \cdot 1} = \frac{4 \pm \sqrt{4}}{2} = \frac{4 \pm 2}{2} \rightarrow \begin{matrix} x=3 \\ x=1 \end{matrix}$$

$$10) a) 3x - 2(x+3) = x - 3(x+1) \Rightarrow 3x - 2x - 6 = x - 3x - 3 \Rightarrow 3x - 2x - x + 3x = 6 - 3$$

$$\Rightarrow 3x = 3 \Rightarrow x = 1$$

$$b) 2x + 7 - 2(x-1) = 3(x+3) \Rightarrow 2x + 7 - 2x + 2 = 3x + 9 \Rightarrow 2x - 2x - 3x = 9 - 7 - 2$$

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

$$c) \frac{x-3}{5} = \frac{x+1}{3} - 2 \Rightarrow \frac{3x-9}{15} = \frac{5x+5}{15} - \frac{30}{15} \Rightarrow 3x-9 = 5x+5-30 \Rightarrow$$

$$3x-5x = 9+5-30 \Rightarrow -2x = -16 \Rightarrow x = \frac{-16}{-2} \Rightarrow x = 8$$

$$d) \frac{2x-4}{3} = 3 - \frac{4+x}{2} \Rightarrow \frac{4x-8}{6} = \frac{18}{6} - \frac{12+x}{6} \Rightarrow 4x-8 = 18-12-x \Rightarrow$$

$$\Rightarrow 4x + x = 18 - 12 + 8 \Rightarrow 7x = 14 \Rightarrow x = \frac{14}{7} \Rightarrow x = 2$$

$$e) \frac{5x-16}{6} = \frac{-x+8}{12} + \frac{x+1}{3} \Rightarrow \frac{10x-32}{12} = \frac{-x+8}{12} + \frac{4x+4}{12} \Rightarrow$$

$$\Rightarrow 10x-32 = -x+8+4x+4 \Rightarrow 10x+x-4x = 32+8+4 \Rightarrow 7x=44 \Rightarrow x = \frac{44}{7}$$

$$f) \frac{x+2}{2} - \frac{x+3}{3} = \frac{-x-4}{4} + \frac{x-5}{5} \Rightarrow \frac{30x+60}{60} - \frac{20x+60}{60} = \frac{-15x-60}{60} + \frac{12x-60}{60}$$

$$30x+60-20x-60 = -15x-60+12x-60 \Rightarrow 10x+15x-12x = -120 \Rightarrow 13x = -120$$

$$\Rightarrow x = \frac{-120}{13}$$

$$g) \frac{6-2(x-3)}{7} = -\frac{8}{4} \Rightarrow \frac{6-2x+6}{7} = -2 \Rightarrow \frac{-2x+12}{7} = \frac{-14}{7} \Rightarrow -2x+12 = -14 \Rightarrow$$

$$\Rightarrow -2x = -14-12 \Rightarrow -2x = -26 \Rightarrow x = \frac{-26}{-2} \Rightarrow x = 13$$

$$h) \frac{x-4}{5} - 4 \cdot (-2x+1) - \frac{(-4x+2)}{10} = 2 \cdot (x-3) + \frac{5x+6}{2} \Rightarrow \frac{x-4}{5} - 8x-4 - \frac{-4x+2}{10} = 2x-6 + \frac{5x+6}{2}$$

$$\Rightarrow \frac{2x-8}{10} + \frac{80x}{10} - \frac{40}{10} - \frac{-4x+2}{10} = \frac{20x-60}{10} + \frac{25x+30}{10} \Rightarrow 2x-8+80x-40+4x-2 = 20x-60+25x+30$$

$$\Rightarrow 2x+80x+4x-20x-25x = -60+30+8+40+2 \Rightarrow 41x = 20 \Rightarrow x = \frac{20}{41}$$

$$i) \frac{3 \cdot (x+3)}{2} - 2 \cdot (2-3x) = 8x-1 - 2 \cdot (x+3) \Rightarrow \frac{3x+9}{2} - 4+6x = 8x-1-2x-6 \Rightarrow$$

$$\Rightarrow \frac{3x+9}{2} - \frac{8}{2} + \frac{12x}{2} = \frac{16x}{2} - \frac{2}{2} - \frac{4x}{2} - \frac{12}{2} \Rightarrow 3x+9-8+12x = 16x-2-4x-12 \Rightarrow$$

$$\Rightarrow 3x+12x-16x+4x = -2-12-9+8 \Rightarrow 3x = -15 \Rightarrow x = \frac{-15}{3} \Rightarrow x = -5$$

$$j) \frac{3 \cdot (x-2)}{5} + 2 \cdot (-3x+1) - \frac{2}{5} = \frac{16}{3} - \frac{4x-3}{15} \Rightarrow \frac{3x-6}{5} - 6x+2 - \frac{2}{5} = \frac{16}{3} - \frac{4x-3}{15} \Rightarrow$$

$$\Rightarrow \frac{9x-18}{15} - \frac{90x}{15} + \frac{30}{15} - \frac{6}{15} = \frac{80}{15} - \frac{4x-3}{15} \Rightarrow 9x-18-90x+30-6 = 80-4x+3 \Rightarrow$$

$$\Rightarrow 9x-90x+4x = 80+3+18-30+6 \Rightarrow -77x = 77 \Rightarrow x = \frac{77}{-77} \Rightarrow x = -1$$

$$k) 2x - \frac{1}{2}(1+3x) - \frac{3}{5} \cdot (x-2) = \frac{1}{4} \cdot (3-x) \Rightarrow 2x - \frac{1}{2} - \frac{3x}{2} - \frac{3x}{5} + \frac{6}{5} = \frac{3}{4} - \frac{x}{4} \Rightarrow$$

$$\Rightarrow \frac{40x}{20} - \frac{10}{20} - \frac{30x}{20} - \frac{12x}{20} + \frac{24}{20} = \frac{15}{20} - \frac{5x}{20} \Rightarrow 40x-10-30x-12x+24 = 15-5x$$

$$\Rightarrow 40x-30x-12x+5x = 15+10-24 \Rightarrow 3x = 1 \Rightarrow x = \frac{1}{3}$$

11) a) $7x^2 - 28 = 0$

$$7x^2 = 28$$

$$x^2 = \frac{28}{7}$$

$$x^2 = 4$$

$$x = \pm \sqrt{4}$$

$$x = \pm 2$$

b) $7x^2 + 28 = 0$

$$7x^2 = -28$$

$$x^2 = \frac{-28}{7}$$

$$x^2 = -4$$

$$x = \pm \sqrt{-4}$$

~~no tiene solución~~

c) $3x^2 = 4x$

$$3x^2 - 4x = 0$$

$$x \cdot (3x - 4) = 0$$

$$x = 0$$

$$3x - 4 = 0$$

$$3x = 4$$

$$x = \frac{4}{3}$$

d) $3x^2 - 12x = 0$

$$x \cdot (3x - 12) = 0$$

$$x = 0$$

$$3x - 12 = 0$$

$$3x = 12$$

$$x = 4$$

e) $4x^2 - 9 = 0$

$$4x^2 = 9$$

$$x^2 = \frac{9}{4}$$

$$x = \pm \sqrt{\frac{9}{4}}$$

$$x = \pm \frac{3}{2}$$

f) $x - 3x^2 = 0$

$$x \cdot (1 - 3x) = 0$$

$$x = 0$$

$$1 - 3x = 0$$

$$1 = 3x$$

$$x = \frac{1}{3}$$

g) $x^2 + 4x - 21 = 0$

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \cdot 1 \cdot (-21)}}{2 \cdot 1} = \frac{-4 \pm \sqrt{100}}{2} = \frac{-4 \pm 10}{2}$$

$$\begin{aligned} x &= \frac{-4 - 10}{2} = -7 \\ x &= \frac{-4 + 10}{2} = 3 \end{aligned}$$

h) $x^2 + 9x + 20 = 0$

$$x = \frac{-9 \pm \sqrt{9^2 - 4 \cdot 1 \cdot 20}}{2 \cdot 1} = \frac{-9 \pm \sqrt{1}}{2} = \frac{-9 \pm 1}{2}$$

$$\begin{aligned} x &= -5 \\ x &= -4 \end{aligned}$$

i) $x^2 + x + 3 = 0$

$$x = \frac{-1 \pm \sqrt{1 - 4 \cdot 1 \cdot 3}}{2 \cdot 1} = \frac{-1 \pm \sqrt{-11}}{2}$$

~~no tiene solución~~

j) $4x^2 - 20x + 25 = 0$

$$x = \frac{-(-20) \pm \sqrt{(-20)^2 - 4 \cdot 4 \cdot 25}}{2 \cdot 4} = \frac{20 \pm 0}{8} = \frac{5}{2}$$

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

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot 3}}{2 \cdot 1} = \frac{2 \pm \sqrt{-8}}{2}$$

~~no tiene solución~~

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

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot (-2) \cdot (-2)}}{2 \cdot (-2)} = \frac{-3 \pm \sqrt{25}}{-4} = \frac{-3 \pm 5}{-4}$$

$$\begin{aligned} x &= \frac{-3 + 5}{-4} = \frac{2}{-4} = -\frac{1}{2} \\ x &= \frac{-3 - 5}{-4} = \frac{-8}{-4} = 2 \end{aligned}$$

$$m) 2 \cdot (x+5)^2 + (x-3)^2 = 14 \cdot (x+4) \Rightarrow 2 \cdot (x^2 + 10x + 25) + (x^2 - 6x + 9) = 14x + 56$$

$$\Rightarrow 2x^2 + 20x + 50 + x^2 - 6x + 9 = 14x + 56 \Rightarrow 2x^2 + 20x + 50 + x^2 - 6x + 9 - 14x - 56 = 0$$

$$\Rightarrow 3x^2 + 3 = 0 \Rightarrow 3x^2 = -3 \Rightarrow x^2 = -1 \Rightarrow x = \pm \sqrt{-1} \quad \text{No solution}$$

$$n) (2x+1)(x-3) = (x+1)(x-1) - 8 \Rightarrow 2x^2 - 6x + x - 3 = x^2 - 1 - 8 \Rightarrow$$

$$\Rightarrow 2x^2 - 5x - 3 - x^2 + 1 + 8 = 0 \Rightarrow x^2 - 5x + 6 = 0$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \cdot 1 \cdot 6}}{2 \cdot 1} = \frac{5 \pm \sqrt{1}}{2} = \frac{5 \pm 1}{2} \rightarrow x = \frac{5+1}{2} = 3$$

$$\rightarrow x = \frac{5-1}{2} = 2$$

$$o) (2x-3)(2x+3) - x \cdot (x+1) - 5 = 0 \Rightarrow 4x^2 - 9 - x^2 - x - 5 = 0$$

$$3x^2 - x - 14 = 0 \Rightarrow x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot 3 \cdot (-14)}}{2 \cdot 3} = \frac{1 \pm \sqrt{169}}{6} =$$

$$= \frac{1 \pm 13}{6} \rightarrow x = \frac{1+13}{6} = \frac{14}{6} = \frac{7}{3}$$

$$\rightarrow x = \frac{1-13}{6} = -2$$

$$p) (2x+1)^2 = 4 + (x+2) \cdot (x-2) \Rightarrow 4x^2 + 4x + 1 = 4 + x^2 - 4 \Rightarrow 4x^2 + 4x + 1 - x^2 = 0$$

$$\Rightarrow 3x^2 + 4x + 1 = 0$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \cdot 3 \cdot 1}}{2 \cdot 3} = \frac{-4 \pm \sqrt{4}}{6} = \frac{-4 \pm 2}{6} \rightarrow x = \frac{-4+2}{6} = -\frac{1}{3}$$

$$\rightarrow x = \frac{-4-2}{6} = -1$$

$$q) \frac{(x-1)(x+2)}{12} - \frac{(x+1) \cdot (x-2)}{6} - 1 = \frac{x-3}{3} \Rightarrow \frac{x^2 - x + 2x - 2}{12} - \frac{x^2 + x - 2x - 2}{6} - 1 = \frac{x-3}{3}$$

$$\Rightarrow \frac{x^2 + x - 2}{12} - \frac{x^2 - 2x - 4}{12} - \frac{12}{12} = \frac{4x-12}{12} \Rightarrow x^2 + x - 2 - x^2 + 2x + 4 - 12 = 4x - 12$$

$$\Rightarrow -x^2 + 3x - 10 - 4x + 12 = 0 \Rightarrow -x^2 - x + 2 = 0$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot (-1) \cdot 2}}{2 \cdot (-1)} = \frac{1 \pm \sqrt{9}}{-2} = \frac{1 \pm 3}{-2} \rightarrow x = \frac{1+3}{-2} = -2$$

$$\rightarrow x = \frac{1-3}{-2} = 1$$

$$r) \frac{x+1}{2} - \frac{(x-1)^2}{4} - \frac{x+2}{3} + \frac{(x-2)^2}{6} = \frac{1}{6} \Rightarrow \frac{x+1}{2} - \frac{x^2 - 2x + 1}{4} - \frac{x+2}{3} + \frac{x^2 - 4x + 4}{6} = \frac{1}{6}$$

$$\frac{6x+6}{12} - \frac{3x^2 - 6x + 3}{12} - \frac{4x+8}{12} + \frac{2x^2 - 8x + 8}{12} = \frac{2}{12} \Rightarrow 6x+6-3x^2+6x-3-4x-8+2x^2-8x+8 = 2$$

$$\Rightarrow -x^2 + 3 - 2 = 0 \Rightarrow -x^2 + 1 = 0 \Rightarrow x^2 = 1 \Rightarrow x = \pm \sqrt{1} \Rightarrow x = \pm 1$$

$$s) \frac{x}{3}(x-1) - \frac{x}{4}(x+1) + \frac{3x+4}{12} = 0$$

$$\frac{x^2}{3} - \frac{x}{3} - \frac{x^2}{4} - \frac{x}{4} + \frac{3x+4}{12} = 0 \Rightarrow \frac{4x^2}{12} - \frac{4x}{12} - \frac{3x^2}{12} - \frac{3x}{12} + \frac{3x+4}{12} = 0$$

$$\Rightarrow 4x^2 - 4x - 3x^2 - 3x + 3x + 4 = 0 \Rightarrow x^2 - 4x + 4 = 0$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1} = \frac{4 \pm \sqrt{0}}{2} = \frac{4 \pm 0}{2} = 2$$

$$t) \frac{x \cdot (x-1)}{3} - \frac{x \cdot (x+1)}{4} + \frac{3x+4}{12} = 0 \Rightarrow \frac{x^2-x}{3} - \frac{x^2+x}{4} + \frac{3x+4}{12} = 0$$

$$\Rightarrow \frac{4x^2-4x}{12} - \frac{3x^2+3x}{12} + \frac{3x+4}{12} = 0 \Rightarrow 4x^2 - 4x - 3x^2 - 3x + 3x + 4 = 0 \Rightarrow$$

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1} = \frac{4 \pm 0}{2} = 2$$

$$u) \frac{3x^2}{2} - \frac{4x-1}{4} = \frac{2x \cdot (x-3)}{6} + \frac{17}{12} \Rightarrow \frac{3x^2}{2} - \frac{4x-1}{4} = \frac{2x^2-6x}{6} + \frac{17}{12} \Rightarrow$$

$$\frac{18x^2}{12} - \frac{12x-3}{12} = \frac{4x^2-12x}{12} + \frac{17}{12} \Rightarrow 18x^2 - 12x + 3 = 4x^2 - 12x + 17 \Rightarrow$$

$$18x^2 - 4x^2 - 12x + 12x + 3 - 17 = 0 \Rightarrow 14x^2 - 14 = 0 \Rightarrow 14x^2 = 14 \Rightarrow x^2 = \frac{14}{14} \Rightarrow x^2 = 1$$

$$\Rightarrow x = \pm \sqrt{1} \Rightarrow x = \pm 1$$

$$v) 3x^2 - 4x + 5(x^2 - 2) = \frac{3x(x-2)}{2} + 14 \Rightarrow 3x^2 - 4x + 5x^2 - 10 = \frac{3x^2 - 6x}{2} + 14 \Rightarrow$$

$$\Rightarrow \frac{6x^2}{2} - \frac{8x}{2} + \frac{10x^2}{2} - \frac{20}{2} = \frac{3x^2 - 6x}{2} + \frac{28}{2} \Rightarrow 6x^2 - 8x + 10x^2 - 20 = 3x^2 - 6x + 28$$

$$6x^2 - 8x + 10x^2 - 20 - 3x^2 + 6x - 28 = 0 \Rightarrow 13x^2 - 2x - 48 = 0$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \cdot 13 \cdot (-48)}}{2 \cdot 13} = \frac{2 \pm \sqrt{2500}}{26} = \frac{2 \pm 50}{26} \rightarrow \begin{aligned} x &= \frac{2+50}{26} = 2 \\ x &= \frac{2-50}{26} = -\frac{24}{13} \end{aligned}$$

$$w) 6x^2 - 1 + \frac{2x \cdot (-x + 3)}{3} = \frac{5x^2 - 2}{6} - 4x^2 + \frac{59}{6} \Rightarrow 6x^2 - 1 + \frac{-2x^2 + 6x}{3} = \frac{5x^2 - 2}{6} - 4x^2 + \frac{59}{6}$$

$$\frac{36x^2 - 6}{6} + \frac{-4x^2 + 12x}{6} = \frac{5x^2 - 2}{6} - \frac{24x^2}{6} + \frac{59}{6} \Rightarrow$$

$$\Rightarrow 36x^2 - 6 - 4x^2 + 12x = 5x^2 - 2 - 24x^2 + 59 \Rightarrow 36x^2 - 4x^2 - 5x^2 + 24x^2 + 12x - 6 + 2 - 59 =$$

$$51x^2 + 12x - 63 = 0$$

$$x = \frac{-12 \pm \sqrt{12^2 - 4 \cdot 51 \cdot (-63)}}{2 \cdot 51} = \frac{-12 \pm \sqrt{12996}}{102} = \frac{-12 \pm 114}{102}$$

$$\begin{aligned} \nearrow x &= \frac{-12 + 114}{102} = 1 \\ \searrow x &= \frac{-12 - 114}{102} = -\frac{21}{17} \end{aligned}$$