EQUACIONS DE 1ʳ GRAU

1. NIVELL 1
2. NIVELL 2
3. NIVELL 3

NIVELL 1

> **Ex.1**
>
> *Resoleu* $5(x – 1) + 10 (x + 2) = 45$
>
> **RAONAMENT**
>
> *Desfer parèntesi* $5x-5+10x+20=45$
>
> *Separar la variable* $5x+10x=5-20+45$
>
> *Agrupar termes* $15x=30$
>
> *Aïllar la variable* $x=30/15=2$

EXERCICIS:

> **1**

1.1.	$2x-34=-20$	*Sol: x=7*
1.2.	$9x+8=7x+6$	*Sol: x=-1*
1.3.	$4x+3=3x+5$	*Sol: x=2*
1.4	$7x+9=3+9x$	*Sol: x=3*

1.5	$x-8=2x-11$	Sol: $x=3$
1.6	$x+1=2x-7$	Sol: $x=8$
1.7	$6x+6=4+8x$	Sol: $x=1$
1.8	$9+9x=17+5x$	Sol: $x=2$
1.9	$2x+3=3x$	Sol: $x=3$
1.10	$25-2x=3x+20$	Sol: $x=1$

RAONAMENT

$\boxed{25 - 2x = 3x + 20}$ $\rightarrow$ $-2x - 3x = 20 - 25$ $\rightarrow$ $-5x = -5$

$\rightarrow$ $5x = 5$ $\rightarrow$ $x = 1$

1.11	$4x+1=3x+3$	Sol: $x=2$
1.12	$5x-3=10x-6$	Sol: $x=3/5$
1.13	$1+8x=-16x+31$	Sol: $x=5/4$
1.14	$5x-11=15x-19$	Sol: $x=4/5$
1.15	$12x-48=-15x-30$	Sol: $x=2/3$
1.16	$2x+17=3x+7$	Sol: $x=10$
1.17	1.17. $10-5x=x-2$	Sol: $x=2$
1.18	$70-3x=4x$	Sol: $x=10$
1.19	$48-3x=5x$	Sol: $x=6$

1.20	*-4x+30=-3x-10*	*Sol: x=40*

RAONAMENT

$\boxed{-4x+30=-3x-10}$ →   *- 4 x + 3 x = - 10 - 30*   →

- x = - 40   →   <mark>*x = 40*</mark>

1.21	*10x-15=4x+27*	*Sol: x=7*
1.22	*x-3(x-2)=6x-2*	*Sol: x=1*
1.23	*3x+1=6x-8*	*Sol: x=3*
1.24	*3x-7=2(x+1)*	*Sol: x=9*
1.25	*47-3x=5+11x*	*Sol: x=3*
1.26	*2(2+4x)=3+12x*	*Sol: x=1/4*
1.27	*30-9x=-7x+21*	*Sol: x=9/2*
1.28	*5x=7(5x-3)+3*	*Sol: x=3/5*
1.29	*3x-10=2x+1*	*x=11*
1.30	*2(x-5)=3x-17*	*Sol: x=7*

RAONAMENT

$\boxed{2(x-5)=3x-17}$ →   *2 x – 10 = 3 x - 17*   →

2 x – 3 x = - 17 + 10   →   *- x = - 7*   →   *x = 7*

1.31	25-2x=3x-35	Sol: x=12
1.32	2+5(x-13)=x-3	Sol: x=15
1.33	75-5x=3x+3	Sol: x=9
1.34	2x-1=3(2x-15)	Sol: x=11
1.35	5+8x=2x+20	Sol: x=5/2
1.36	2(x-2)=-(4-x)	Sol: x =0
1.37	2y-3= y +5	Sol: y =8
1.38	2(3x-49)= - x +14	Sol: x =16
1.39	2-6x=3x-1	Sol: x=1/3
1.40	20=2x-(10-4x)	Sol: x=5

RAONAMENT

$$20 = 2x - (10 - 4x) \quad \rightarrow \quad 20 = 2x - 10 + 4x \quad \rightarrow$$

$$-4x - 2x = -10 - 20 \quad \rightarrow \quad -6x = -30 \quad \rightarrow \quad 6x = 30$$

$$\rightarrow \quad x = 5$$

1.41	60x-1=3(1+12x)	Sol: x=1/6
1.42	5(x-1)+10(x+2)=45	Sol: x=2
1.43	2x+3(2x-1)=x+67	Sol: x=10
1.44	12x+3(2x-4)=60	Sol: x=4

equacions de primer grau

1.45	$3-2x(5-2x)=4x^2+x-30$	*Sol: x=3*
1.46	$3x-(x+1)=x-2$	*Sol: x=-1*
1.47	$3[2x-(3x+1)]=x+1$	*Sol: x=-1*
1.48	$x-3(x+5)=3x+10$	*Sol: x=-5*
1.49	$(x-15)=3(x-19)$	*Sol: x=21*
1.50	$3(2-x)=18x-1$	*Sol: x=1/3*

RAONAMENT

$$\boxed{3(2-x)=18x-1} \quad \rightarrow \quad 6-3x=18x-1 \quad \rightarrow$$

$$-3x-18x=-1-6 \quad \rightarrow \quad -21x=-7 \quad \rightarrow \quad 21x=7$$

$$\rightarrow \quad x=7/21=1/3$$

1.51	$3(x+4)=4x+1$	*Sol: x=11*
1.52	$10+5(x-3)=3(x+1)$	*Sol: x=4*
1.53	$2(3-4x)=2x-9$	*Sol: x=3/2*
1.54	$10-9x=4(x-4)$	*Sol: x=2*
1.55	$2(3x+2)=4[2x-5(x-2)]$	*Sol: x=2*
1.56	$15x=2(1+9x)-3$	*Sol: x=1/3*
1.57	$3(12-x)-4x=2(11-x)+9x$	*Sol: x=1*

1.58	$x+3=3(2x-4)$	Sol: $x=3$

NIVELL 2

Ex.2

Resoleu:
$$\frac{3\,(x+1)}{4} - \frac{x+3}{6} + x = 2x + \frac{3-7x}{12}$$

RAONAMENT

Eliminar denominador
$$12 \cdot \frac{3\,(x+1)}{4} - 12 \cdot \frac{x+3}{6} + 12x = 12 \cdot 2x + 12 \cdot \frac{3-7x}{12}$$

$$9(x+1) - 2(x+3) + 12x = 24x + (3-7x)$$

Desfer parèntesi $9x + 9 - 2x - 6 + 12x = 24x + 3 - 7x$

Separar la variable $9x - 2x + 12x - 24x + 7x = -9 + 6 + 3$

Agrupar termes $2x = 0$

Aïllar la variable $x = \dfrac{0}{2} = 0$

EXERCICIS

2

Resoleu:

2.1	$\dfrac{3x}{2} + 2 = x + 4$	Sol. $x=4$

2.2	$x - 8 = \dfrac{x}{2} - \dfrac{x-6}{3}$	Sol. $x=12$
2.3	$x - \dfrac{3x}{4} = \dfrac{x}{7} + 3$	Sol. $x=28$
2.4	$2\left(\dfrac{x+5}{3}\right) = x + 3$	Sol. $x=1$

RAONAMENT

$$\boxed{2\left(\dfrac{x+5}{3}\right) = x + 3} \rightarrow 2(x+5)=3(x+3) \rightarrow 2x+10=3x+9$$

$$2x-3x=9-10 \rightarrow -x=-1 \rightarrow x=1$$

2.5	$\dfrac{9x}{4} - 6 = \dfrac{2x}{3} + \dfrac{1}{3}$	Sol. $x=4$
2.6	$\dfrac{5x}{6} - \dfrac{3x}{4} = x - 11$	Sol. $x=12$
2.7	$\dfrac{3x}{5} - 7 = \dfrac{2x}{6} + 1$	Sol. $x=30$
2.8	$x - 10 = \dfrac{5}{9}(x - 6)$	Sol. $x=15$
2.9	$\dfrac{x}{3} + x = 10 + \dfrac{2x}{9}$	Sol. $x=9$

RAONAMENT

$$\boxed{\dfrac{x}{3} + x = 10 + \dfrac{2x}{9}} \rightarrow 3x + 9x = 90 + 2x \rightarrow$$

$3x + 9x - 2x = 90$ $\rightarrow$ $10x = 90$ $\rightarrow$ $x = 9$

2.10	$\dfrac{3x}{2} + 1 = 12 - \dfrac{x}{3}$	Sol. x=6
2.11	$\dfrac{x}{5} + \dfrac{x}{2} = x - 3$	Sol. x=10
2.12	$4x - 7 = \dfrac{5x - 6}{4}$	Sol. x=2
2.13	$\dfrac{x + 2}{3} = 5x - 4$	Sol. x=1 2.

RAONAMENT

$\boxed{\dfrac{x+2}{3} = 5x - 4}$ $\rightarrow$ $x + 2 = 3(5x - 4)$ $\rightarrow$ $x + 2 = 15x - 12$

$\rightarrow$ $x - 15x = -12 - 2$ $\rightarrow$ $-14x = -14$ $\rightarrow$ $14x = 14$

$\rightarrow$ $x = 1$

2.14	$\dfrac{2x - 10}{3x - 20} = \dfrac{7}{8}$	Sol. x=12
2.15	$\dfrac{x}{4} + \dfrac{3x}{6} + x = 21$	Sol. x=12
2.16	$\dfrac{x}{4} - \dfrac{13}{6} = \dfrac{5x}{2} - \dfrac{5}{6}$	Sol. x=-16/27
2.17	$\dfrac{x}{3} + \dfrac{x}{4} + \dfrac{x}{5} = 94$	Sol. x=120

RAONAMENT

$\dfrac{x}{3} + \dfrac{x}{4} + \dfrac{x}{5} = 94$ → $20x + 15x + 12x = 94 \cdot 60$ →

$47x = 47 \cdot 120$ → $x = 120$

2.18	$\dfrac{x}{3} + 10 = \dfrac{x}{5} + 16$	Sol. $x=45$
2.19	$\dfrac{x-7}{x+3} = \dfrac{10}{x+3} - 3$	Sol. $x=2$
2.20	$3x - 9 + \dfrac{x}{5} = 2x - 3$	Sol. $x=5$
2.21	$\dfrac{x}{4} + 5 = \dfrac{2x}{5} - 2 - \dfrac{x}{30}$	Sol. $x=60$

RAONAMENT

$\dfrac{x}{4} + 5 = \dfrac{2x}{5} - 2 - \dfrac{x}{30}$ → $15x + 300 = 24x - 120 - 2x$ →

$15x - 24x + 2x = -120 - 300$ → $-7x = -420$ →

$7x = 420$ → $x = 60$

2.22	$\dfrac{5x}{8} - 5(x-20) = \dfrac{-2x + 18}{6}$	Sol. $x=24$
2.23	$x + \dfrac{x+1}{5} = x + \dfrac{x}{2}$	Sol. $x=2/3$

equacions de primer grau

2.24	$3x - \dfrac{7-x}{8} = -1 + \dfrac{x-3}{4} + 2x$	Sol. x=-1
2.25	$8 - \dfrac{3x}{10} + \dfrac{2x}{4} - \dfrac{5x}{8} = -9$	Sol. x=40

RAONAMENT

$\boxed{8 - \dfrac{3x}{10} + \dfrac{2x}{4} - \dfrac{5x}{8} = -9}$ $\rightarrow$ $320 - 12x + 20x - 25x = -360$

$\rightarrow$ $-12x + 20x - 25x = -360 - 320$ $\rightarrow$ $-17x = -680$

$\rightarrow$ $17x = 680$ $\rightarrow$ $x = 40$

2.26	$\dfrac{x+1}{2} + \dfrac{3+x}{6} = 1 + \dfrac{x}{3}$	Sol. x=0
2.27	$\dfrac{3x}{5} - 2 + \dfrac{3x}{2} - \dfrac{x}{10} = 0$	Sol. x=1
2.28	$\dfrac{7x-3}{6} - \dfrac{3x-1}{4} = \dfrac{5x-1}{4}$	Sol. x=0
2.29	$\dfrac{4x-3}{6} - \dfrac{3x-1}{4} = \dfrac{4x-2}{3} - 1$	Sol. x=1

RAONAMENT

$\boxed{\dfrac{4x-3}{6} - \dfrac{3x-1}{4} = \dfrac{4x-2}{3} - 1}$

$2(4x-3) - 3(3x-1) = 4(4x-2) - 12$

$8x - 6 - 9x + 3 = 16x - 8 - 12$

$8x - 9x - 16x = -8 - 12 - 3 + 6$

$-17x = -17 \quad \rightarrow \quad 17x = 17 \quad \rightarrow \quad x = 1$

2.30	$\dfrac{3(x+1)}{4} - \dfrac{x+3}{6} + x = 2x + \dfrac{3-7x}{12}$	Sol. $x=0$
2.31	$\dfrac{2x}{5} - 2 - \dfrac{x}{3} = \dfrac{x}{10} - 3$	Sol. $x=30$
2.32	$\dfrac{2x+1}{4} - \dfrac{3x}{9} - 2 = \dfrac{3x-2}{4}$	Sol. $x=-15/7$
2.33	$\dfrac{x}{3} + \dfrac{x-5}{2} - \dfrac{1}{4}x = \dfrac{5x-2}{2}$	Sol. $x=-18/23$
3.34	$\dfrac{x-3}{3} - \dfrac{3(x-2)}{2} = \dfrac{x-3-(x+2)}{2}$	Sol. $x=27/7$

RAONAMENT

$$\boxed{\dfrac{x-3}{3} - \dfrac{3(x-2)}{2} = \dfrac{x-3-(x+2)}{2}}$$

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

$2x - 6 - 9x + 18 = 3x - 9 - 3x - 6$

$2x - 9x - 3x + 3x = -9 - 6 + 6 - 18$

$-7x = -27 \quad \rightarrow \quad 7x = 27 \quad \rightarrow \quad x = 27/7$

NIVELL 3

Ex.3

Resoleu:

$$\frac{x+2}{x-1} - \frac{x+3}{x+1} = \frac{2x+2}{x^2-1}$$

RAONAMENT

Eliminar denominadors

$$(x^2-1)\frac{x+2}{x-1} - (x^2-1)\frac{x+3}{x+1} = (x^2-1)\frac{2x+2}{x^2-1}$$

$$(x+1)(x+2) - (x-1)(x+3) = 2x+2$$

Desfer parèntesi　　　$x^2 + 3x + 2 - x^2 - 2x + 3 = 2x + 2$

Separar la variable　　$3x - 2x - 2x = -2 - 3 + 2$

Agrupar termes　　　　$-x = -3$

Aïllar la variable　　　$x = 3$

EXERCICIS:

3

Resoleu:

3.1	$\dfrac{\dfrac{3x}{5} - 12}{x+1} = 6$	Sol. $x=5$
3.2	$\dfrac{3}{x+1} = \dfrac{x}{x-1} - 1$	Sol. $x=2$
3.3	$\dfrac{10}{x+5} + \dfrac{3+4x}{x+5} = 3$	Sol. $x=2$

3.4	$\dfrac{x+2}{x-1} - \dfrac{x+3}{x+1} = \dfrac{2x+2}{x^2-1}$	Sol. $x=3$
3.5	$\dfrac{15}{x+10} - \dfrac{5}{x+2} = 0$	Sol. $x=2$

RAONAMENT

$$\boxed{\dfrac{15}{x+10} - \dfrac{5}{x+2} = 0} \quad \rightarrow \quad 15(x+2) - 5(x+10) = 0 \quad \rightarrow$$

$$15x + 30 - 5x - 50 = 0 \quad \rightarrow \quad 15x - 5x = 50 - 30 \quad \rightarrow$$

$$10x = 20 \quad \rightarrow \quad x = 2$$

3.6	$\dfrac{5}{x-1} - \dfrac{3}{x+4} - \dfrac{3}{x^2+3x-4} = \dfrac{5}{x-1}$	Sol. $x=0$
3.7	$\dfrac{15}{x-2} - \dfrac{12x+6}{x^2-4} = \dfrac{18}{x+2}$	Sol. $x=4$
3.8	$\dfrac{1}{x-a} + \dfrac{1}{x+a} = \dfrac{1}{x^2-a^2}$	Sol. $x=1/2$
3.9	$\dfrac{x}{2a} - 2 = \dfrac{1+x}{2}$	Sol. $x=5a/(1-a)$
3.10	$\dfrac{1 + \dfrac{x+1}{x-1}}{2 - \dfrac{x-1}{x+1}} = 2$	Sol. $x=3$

RAONAMENT

$$\dfrac{1 + \dfrac{x+1}{x-1}}{2 - \dfrac{x-1}{x+1}} = 2 \rightarrow \dfrac{(x+1)((x-1)+(x+1))}{(x-1)(2(x+1)-(x-1))} = 2 \rightarrow$$

$$\dfrac{(x+1)(2x)}{(x-1)(x+3))} = 2$$

$$\rightarrow \ (x+1)\,2x = 2(x-1)(x+3) \rightarrow \ 2x^2 + 2x = 2x^2 + 4x - 6$$

$$\rightarrow 2x - 4x = -6 \quad \rightarrow -2x = -6 \rightarrow \quad 2x = 6 \quad \rightarrow \quad x = 3$$