EQUACIONS DE SEGON GRAU

NIVELL 1

NIVELL 2

NIVELL 1

Ex.1

Resoleu: $x^2-6x+9=0$

RAONAMENT

Aplicar la fórmula

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{6\pm\sqrt{36-36}}{2}=\frac{6\pm 0}{2}=\begin{cases}3\\3\end{cases}$$

Ex.2

Resoleu: $4x^2-6x=0$

RAONAMENT

Treure factor comú $x(4x-6)=0$

Plantejar les equacions:

$$\begin{cases}x=0\\4x-6=0\end{cases}$$

Trobar solucions

$$\begin{cases}x=0\\x=\frac{6}{4}=\frac{3}{2}\end{cases}$$

Ex.1

Resoleu: $4x^2-17=0$

RAONAMENT

Separar la variable $4x^2 = 17$

Aïllar la variable $x^2 = \frac{17}{4}$

Trobar solucions $x = \pm\sqrt{\frac{17}{4}} = \pm\frac{\sqrt{17}}{2}$

EXERCICIS:

1

Resoleu:

1.1	$x^2-9x+18=0$ $x^2-9x=0$ $x^2+18=0$	*Sol: x=3; x=6* *Sol: x=0 x=9* *sense solució*
1.2	$x^2-5x+6=0$ $x^2-5x=0$ $x^2+6=0$	*Sol: x=2; x=3* *Sol: x=0 x=5* *sense solució*
1.3	$x^2+8x+15=0$ $x^2+8x=0$ $x^2+15=0$	*Sol: x=-5 x=-3* *Sol: x=0 x=-8* *sense solució*
1.4	$x^2-6x-27=0$ $x^2-6x=0$ $x^2-27=0$	*Sol: x=-3 x=9* *Sol: x=0 x=6* *Sol:* $x = \pm\sqrt{27}$
1.5	$x^2-6x+9=0$ $x^2-6x=0$ $x^2-9=0$	*Sol: x=3* *Sol: x=0 x=6* *Sol: x=-3 x=3*
1.6	$x^2+6x=-9$ $x^2+6x=0$ $x^2 = -9$	*Sol: x=-3* *Sol: x=0 x=-6* *sense solució*

1.7	$4x^2+4x=3$ $4x^2+4x=0$ $4x^2=3$	*Sol: x=1/2 x=-3/2* *Sol: x=0 x=-1* *Sol:* $x=\pm\sqrt{3/4}$
1.8	$x^2-9x+14=0$ $x^2-9x=0$ $x^2+14=0$	*Sol: x=2 x=7* *Sol: x=0 x=9* *sense solució*
1.9	$x^2-6x+8=0$ $x^2-6x=0$ $x^2+8=0$	*Sol: x=4 x=2* *Sol: x=0 x=6* *sense solució*
1.10	$2x^2+10x-48=0$ $2x^2+10x=0$ $2x^2-48=0$	*Sol: x=3 x=-8* *Sol: x=0 x=-5* *Sol:* $x=\pm\sqrt{24}$
1.11	$x^2-x=20$ $x^2-x=0$ $x^2=20$	*Sol: x=-4 x=5* *Sol: x=0 x=1* *Sol:* $x=\pm\sqrt{20}$
1.12	$x^2=5x+6$ $x^2=5x$ $x^2=6$	*Sol: x=6 x=-1* *Sol: x=0 x=5* *Sol:* $x=\pm\sqrt{6}$
1.13	$2x^2-5x+3=0$ $2x^2-5x=0$ $2x^2+3=0$	*Sol: x=1 x=3/2* *Sol: x=0 x=5/2* *sense solució*
1.14	$x^2+10x+25=0$ $x^2+10x=0$ $x^2+25=0$	*Sol: x=-5* *Sol: x=0 x=-10* *sense solució*
1.15	$x^2+9=10x$ $x^2=10x$ $x^2+9=0$	*Sol: x=1 x=9* *Sol: x=0 x=10* *sense solució*

1.16	$3x^2-39x+108=0$ $3x^2-39x=0$ $3x^2+108=0$	*Sol: x=4 x=9* *Sol: x=0 x=13* *sense solució*
1.17	$2x^2-9x+9=0$ $2x^2-9x=0$ $2x^2+9=0$	*Sol: x=3 x=3/2* *Sol: x=0 x=9/2* *sense solució*
1.18	$3x^2+2x=8$ $3x^2+2x=0$ $3x^2=8$	*Sol: x=-2 x=4/3* *Sol: x=0 x=-2/3* *Sol:* $x=\pm\sqrt{8/3}$
1.19	$4x^2+12x+9=0$ $4x^2+12x=0$ $4x^2+9=0$	*Sol: x=-3/2* *Sol: x=0 x=-3* *sense solució*
1.20	$5x^2+1=6x$ $5x^2=6x$ $5x^2+1=0$	*Sol: x=1 x=1/5* *Sol: x=0 x=6/5* *sense solució*

NIVELL 2

Ex.2

Resoleu: $2+\frac{x+4}{3}=\frac{4x+4}{3}+\frac{2-x}{x-3}$

RAONAMENT

Treure denominador

$$3(x-3)2+3(x-3)\frac{x+4}{3}=3(x-3)\frac{4x+4}{3}+3(x-3)\frac{2-x}{x-3}$$

$$6(x-3)+(x-3)(x+4)=(x-3)(4x+4)+3(2-x)$$

Operar i simplificar

$6x-18+x^2+x-12=4x^2-8x-12+6-3x$

$3x^2 - 18x + 24 = 0$; $x^2 - 6x + 8 = 0$

trobar solucions $x=\frac{6\pm\sqrt{36-32}}{2}=\frac{6\pm 2}{2}=\begin{cases}4\\2\end{cases}$

EXERCICIS

2

Resoleu:

2.1	$1 - \frac{x^2}{3} - \frac{3x+2}{3} = 1$	*Sol: x=-2 , x=-1*
2.2	$\frac{(x-3)^2}{2} - x + x^2 = x - (x-2)$	*Sol: x=1 , x=5/3*
2.3	$\frac{1}{x-1} + 3x + 3x^2 - 2 = \frac{3}{x-1} + 3x^2$	*Sol: x=5/3 , x=0*
2.4	$(x-3)^2 - \frac{x-1}{3} = 2x$	*Sol: x=4/3 , x=7*

RAONAMENT

$(x-3)^2 - \frac{x-1}{3} = 2x \rightarrow 3(x-3)^2 - (x-1) = 6x \rightarrow$

$3x^2 - 18x + 27 - x + 1 = 6x \rightarrow 3x^2 - 25x + 28 = 0$

$\rightarrow \quad x=\begin{cases} 7 \\ 4/3 \end{cases}$

2.5	$\frac{x-3}{3} - \frac{1}{x-1} = 3x$	*Sol:* $x=5/8$, $x=0$
2.6	$x - \frac{2}{x} + \frac{1}{2x} = 5x + 5$	*Sol:* $x=-3/4$, $x=-1/2$
2.7	$\frac{x-3}{x} + 3x - \frac{5}{x} = 2x - \frac{3}{x} - 3$	*Sol:* $x=-5$, $x=1$
2.8	$3x - \frac{8}{x} + (x-1) = 3(x-2) - (x-5)$	*Sol:* $x=-2$, $x=2$

RAONAMENT

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

$3x^2 - 18x + 27 - x + 1 = 6x \quad \rightarrow \quad 3x^2 - 25x + 28 = 0$

$\rightarrow \quad x=\begin{cases} 7 \\ 4/3 \end{cases}$

2.9	$(x-3)(x-2) + \frac{x(x-3)}{2} = (x-2)^2$	*Sol:* $x=1$, $x=4$

2.10	$(x-2)\ x - \frac{x+2}{3} - \frac{(x-2)\ (x+2)}{2} = (x-2)^2 - 4$	Sol: x=-2/3, x=4
2.11	$(x-3)^2 - \frac{x-2}{3} + (3-x)\ (x-1) = (x-2)^2$	Sol: x=-1, x=8/3
2.12	$\frac{x-1}{x+1} - \frac{3+x}{x} = 2$	Sol: x=-3, x=-1/2

RAONAMENT

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

$\rightarrow x^2 - x - x^2 - 4x - 3 = 2x^2 + 2x \rightarrow 2x^2 + 7x + 3 = 0$

$\rightarrow x = \begin{cases} -1/2 \\ -3 \end{cases}$

2.13	$\frac{x-1}{x+1} - \frac{3+x}{x-1} = 2$	Sol: x=-3, x=0
2.14	$x + \frac{1}{x-2} = 4$	Sol: x=3
2.15	$x^2 - x = \frac{2}{9} - \frac{2x}{3}$	Sol: x=-1/3, x=2/3
2.16	$\frac{x^2}{3} + 2 = \frac{5x}{3}$	Sol: x=2, x=3

RAONAMENT $\frac{x^2}{3} + 2 = \frac{5x}{3} \rightarrow x^2 + 6 = 5x \rightarrow x^2 - 5x + 6 = 0$ $\rightarrow x = \begin{cases} 3 \\ 2 \end{cases}$		
2.17	$x + \frac{2}{x} = 3$	*Sol:* *x=1,* *x=2*
2.18	$x - 2 = \frac{4x-8}{x}$	*Sol:* *x=4,* *x=2*
2.19	$\frac{x}{2} + \frac{3}{x} = \frac{2x+9}{x}$	*Sol:* *x=-2,* *x=6*
2.20	$2x - 2 = \frac{6x}{x-1} - 5$	*Sol:* *x=-1/2,* *x=3*
RAONAMENT $2x - 2 = \frac{6x}{x-1} - 5 \rightarrow (x-1)(2x-2) = 6x - 5(x-1) \rightarrow$ $2x^2 - 4x + 2 = x + 5 \rightarrow 2x^2 - 5x - 3 = 0$ $\rightarrow x = \begin{cases} 3 \\ -1/2 \end{cases}$		

2.21	$x\ (x+1)\ -\ \left(x+\frac{x}{2}\right)=0$	Sol: x=0, x=1/2
2.22	$3x\ +\ 1\ -\ \frac{3}{x}=\frac{1+3x}{4}$	Sol: x=1, x=-4/3
2.23	$2\ +\ \frac{x+4}{3}=\frac{4x+4}{3}\ +\ \frac{2-x}{x-3}$	Sol: x=2, x=4
2.24	$x\ +\ \frac{1}{x}=\frac{6}{3x}$	Sol: x=1, x=-1

RAONAMENT

$\boxed{x\ +\ \frac{1}{x}=\frac{6}{3x}}\quad\rightarrow\quad x^2+1=2\quad\rightarrow\quad x^2=1$

$\rightarrow\quad x=\begin{cases}+1\\-1\end{cases}$

2.25	$x\ -\ 2=\frac{2x-3}{x}$	Sol: x=3, x=1
2.26	$\frac{x}{3}\ +\ \frac{2}{x}=\frac{3x+10}{3x}$	Sol: x=-1, x=4
2.27	$x\ +\ 3=\frac{2x+1}{x-1}$	Sol: x=-2, x=2

2.28	$\dfrac{3}{x+\dfrac{1}{2+\dfrac{x+1}{x-2}}}=\dfrac{1}{x}$	*Sol:* *x=1/2,* *x=2/3*
2.29	$\dfrac{\dfrac{x-3}{2}-\dfrac{x-3}{4}}{x-\dfrac{1}{1-\dfrac{x-1}{x+1}}}=-\dfrac{1}{x}$	*Sol:* *x=-1 ,* *x=2*

RAONAMENT

$$\boxed{\dfrac{\dfrac{x-3}{2}-\dfrac{x-3}{4}}{x-\dfrac{1}{1-\dfrac{x-1}{x+1}}}=-\dfrac{1}{x}} \quad \rightarrow \quad \dfrac{\dfrac{x-3}{2}-\dfrac{x-3}{4}}{x-\dfrac{x+1}{2}}=-\dfrac{1}{x} \quad \rightarrow$$

$$\dfrac{\dfrac{x-3}{4}}{\dfrac{x-1}{2}}=-\dfrac{1}{x} \quad \rightarrow \quad \dfrac{x-3}{2x-2}=\dfrac{-1}{x} \quad \rightarrow \quad x^2-3x=-2x+2$$

$$\rightarrow \quad x^2-x-2=0 \quad \rightarrow \quad x=\begin{cases}2\\-1\end{cases}$$