Resuelva las siguientes ecuaciones (¡ojo con la propiedad distributiva!):

1) $-x^2 - 9x - 40 = 0$

2) $\frac{x}{2}\left(x + \frac{1}{30}\right) = \frac{x}{3}\left(x + \frac{2}{5}\right)$

3) $3x(5x + 2) = 0$

4) $\frac{x}{3}\left(x - \frac{1}{20}\right) = \frac{x^2}{2} - \frac{1}{15}\left(2x - \frac{1}{2}\right)$

5) $5x^2 = 45$

6) $\frac{x^2}{2} + x = \frac{2x^2 - 5}{3} - 1$

7) $5x^2 = x^2 - 2x$

8) $x^2 - \frac{1}{4} = \frac{1}{5}\left(\frac{x}{4} - 1\right)$

RESUELVA LAS SIGUIENTES ECUACIONES

1) $-x^2-9x-40=0$

$x^2+9x+40=0$ $\quad \begin{cases} a=1 \\ b=9 \\ c=40 \end{cases}$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-9\pm\sqrt{81-4(1)(40)}}{2}=\frac{-9\pm\sqrt{81-160}}{2}=$$

$$=\frac{-9\pm\sqrt{-79}}{2}$$ No tiene solución real

2) $\frac{x}{2}\left(x+\frac{1}{30}\right)=\frac{x}{3}\left(x+\frac{2}{5}\right)$

$mcm(2,60,3,15)=60$

$2=2$

$60=2^2\cdot 3\cdot 5$

$3=3$

$15=3\cdot 5$

$$\frac{x^2}{2}+\frac{x}{60}=\frac{x^2}{3}+\frac{2x}{15}$$

$$\frac{30x^2}{60}+\frac{x}{60}=\frac{20x^2}{60}+\frac{8x}{60}$$

$30x^2+x=20x^2+8x$

$30x^2+x-20x^2-8x=0$

$10x^2-7x=0$

$x(10x-7)=0 \Rightarrow \begin{cases} x=0 \\ 10x-7=0 \Rightarrow 10x=7 \Rightarrow x=\frac{7}{10} \end{cases}$

3) $3x \cdot (5x + 2) = 0 \Rightarrow \begin{cases} 3x = 0 \Rightarrow x = \frac{0}{3} = 0 \\ 5x + 2 = 0 \Rightarrow 5x = -2 \Rightarrow x = \frac{-2}{5} \end{cases}$

4) $\frac{x}{3}\left(x - \frac{1}{20}\right) = \frac{x^2}{2} - \frac{1}{15}\left(2x - \frac{1}{2}\right)$

$\text{mcm}(3, 60, 2, 15, 30) = 60$

$3 = 3$
$60 = 2^2 \cdot 3 \cdot 5$
$2 = 2$
$15 = 3 \cdot 5$
$30 = 2 \cdot 3 \cdot 5$

$\frac{x^2}{3} - \frac{x}{60} = \frac{x^2}{2} - \frac{2x}{15} + \frac{1}{30}$

$\frac{20x^2}{60} - \frac{x}{60} = \frac{30x^2}{60} - \frac{8x}{60} + \frac{2}{60}$

$20x^2 - x = 30x^2 - 8x + 2$

$20x^2 - x - 30x^2 + 8x - 2 = 0$

$-10x^2 + 7x - 2 = 0$

$10x^2 - 7x + 2 = 0$

$\begin{cases} a = 10 \\ b = -7 \\ c = 2 \end{cases}$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{7 \pm \sqrt{49 - 4(10)(2)}}{20} =$

$= \frac{7 \pm \sqrt{49 - 80}}{20} = \frac{7 \pm \sqrt{-31}}{20}$ No tiene solución real

5) $5x^2 = 45$

$x^2 = \frac{45}{5} = 9 \Rightarrow x^2 = 9 \Rightarrow x = \pm\sqrt{9} = \pm 3$

6) $\frac{x^2}{2} + x = \frac{2x^2-5}{3} - 1$

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

$3x^2 + 6x = 2(2x^2-5) - 6$

$3x^2 + 6x = 4x^2 - 10 - 6$

$3x^2 + 6x - 4x^2 + 10 + 6 = 0$

$-x^2 + 6x + 16 = 0$

$x^2 - 6x - 16 = 0$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{6 \pm \sqrt{36+64}}{2} = \frac{6 \pm \sqrt{100}}{2} =$

$= \frac{6 \pm 10}{2} = \begin{cases} \frac{6+10}{2} = \frac{16}{2} = 8 \\ \frac{6-10}{2} = \frac{-4}{2} = -2 \end{cases}$

7) $5x^2 = x^2 - 2x$

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

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

$x(-4x-2) = 0 \Rightarrow \begin{cases} x = 0 \\ -4x - 2 = 0 \Rightarrow -4x = 2 \Rightarrow x = -\frac{2}{4} = -\frac{1}{2} \end{cases}$

8) $x^2 - \frac{1}{4} = \frac{1}{5}\left(\frac{x}{4} - 1\right)$

$mcm(4, 20, 5) = 20$

$4 = 2^2$

$20 = 2^2 \cdot 5$

$5 = 5$

$$x^2 - \frac{1}{4} = \frac{x}{20} - \frac{1}{5}$$

$$\frac{20x^2}{20} - \frac{5}{20} = \frac{x}{20} - \frac{4}{20}$$

$$20x^2 - 5 = x - 4$$

$$20x^2 - x - 5 + 4 = 0$$

$$20x^2 - x - 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{+1 \pm \sqrt{1 + 80}}{40} = \frac{1 \pm \sqrt{81}}{40} =$$

$$= \frac{1 \pm 9}{40} = \begin{cases} \frac{1+9}{40} = \frac{10}{40} = \frac{1}{4} \\ \frac{1-9}{40} = \frac{-8}{40} = \frac{-1}{5} \end{cases}$$