HW #5 12, 24, 26, 28, 46, 58, 70, 88, 92, 98

12) $5x-3=4 \Rightarrow 5x=7 \Rightarrow \boxed{x=\frac{7}{5}}$

24) $\frac{2x-1}{x+2}=\frac{4}{5} \Rightarrow 10x-5=4x+8 \Rightarrow 6x=13 \Rightarrow \boxed{x=\frac{13}{6}}$

26) $\frac{4}{x-1}+\frac{2}{x+1}=\frac{35}{x^2-1} \Rightarrow \frac{4(x+1)}{(x+1)(x-1)}+\frac{2(x-1)}{(x+1)(x-1)}=\frac{35}{x^2-1}$

$\Rightarrow 4(x+1)+2(x-1)=35$

$\Rightarrow 4x+4+2x-2=35$

$6x=33 \Rightarrow \boxed{x=\frac{33}{6}=\frac{11}{2}}$

28) $\sqrt{3}x+\sqrt{12}=\frac{x+5}{\sqrt{3}} \Rightarrow 3x+6=x+5$

$\Rightarrow 2x=-1 \Rightarrow \boxed{x=-\frac{1}{2}}$

46) $x^2+8x+12=0$

$(x+2)(x+6)=0$ $\boxed{x=-2,-6}$

$x+2=0 \quad x+6=0$

58) $x^2+3x-\frac{7}{4}=0 \Rightarrow x^2+3x=\frac{7}{4} \Rightarrow \left(x^2+3x+\left(\frac{3}{2}\right)^2\right)=\frac{7}{4}+\left(\frac{3}{2}\right)^2$

$\Rightarrow \left(x+\frac{3}{2}\right)^2=\frac{16}{4}=4$

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

$\boxed{x=\frac{1}{2},-\frac{7}{2}}$

70) $x^2-6x+1=0 \Rightarrow x=\frac{-(-6)\pm\sqrt{(-6)^2-4(1)(1)}}{2(1)}=\frac{6\pm\sqrt{36-4}}{2}=\frac{6\pm\sqrt{32}}{2}$

$\boxed{=3\pm 2\sqrt{2}}$

88) $\frac{1}{x-1}-\frac{2}{x^2}=0 \Rightarrow x^2-2(x-1)=0 \Rightarrow x^2-2x+2=0$

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

NO REAL SOLUTIONS since $\sqrt{-4}$

92) $\sqrt{5-x}+1=x-2 \Rightarrow 5-x=(x-3)^2 \Rightarrow 5-x=x^2-6x+9 \Rightarrow x^2-5x+4=0$

$\Rightarrow (x-1)(x-4)=0$ so $x=4,1$ but we must check the square root.

$x=4: \sqrt{5-(4)} \stackrel{?}{=} (4)-3$

$\sqrt{1}=1$ ✓

Solution $x=4$

$x=1: \sqrt{5-(1)} \stackrel{?}{=} (1)-3$

$\sqrt{4} \stackrel{?}{=} -2$

$2 \neq -2$ Fails

98) $x^6 - 2x^3 - 3 = 0$

$(x^3+1)(x^3-3) = 0$

$x^3+1=0$ $\qquad$ $x^3-3=0$

$x^3=-1$ $\qquad$ $x^3=3$

$x=\sqrt{-1}=-1$ $\qquad$ $x=\sqrt[3]{3}$

$\boxed{x=-1,\ \sqrt[3]{3}}$