Int 3 MA C3 Solving Equations WS Name Key Per ____ Group ____

Solve the following.

1. $2|3x+7|-5=4x-3$

$|3x+7| = \frac{4x+2}{2}$

$|3x+7| = 2x+1$

$3x+7=2x+1$ $-(3x+7)=2x+1$

$x=-6$ $-3x-7=2x+1$

$-8=5x$

$x=-8/5$

No Solution

[both are extraneous]

2. $2x^{\frac{2}{3}}-9x^{\frac{1}{3}}-5=0$ $u=x^{1/3}$

$2u^2-9u-5=0$

$(2u+1)(u-5)=0$

$u=-\frac{1}{2}$ $u=5$

$(x^{\frac{1}{3}})^3=(-\frac{1}{2})^3 \rightarrow x=-\frac{1}{8}$

$(x^{\frac{1}{3}})^3=(5)^3 \rightarrow x=125$

3. $x-2x^{\frac{1}{2}}-3=0$ $u=x^{1/2}$

$u^2-2u-3=0$

$(u-3)(u+1)=0$

$u=3$ $u=-1$

$(x^{1/2})^2=(3)^2$ $(x^{1/2})^2=(-1)^2$

$x=9$ ✓ $x=1$ extraneous

4. $x^{-2}+10x^{-1}+9=0$ $u=x^{-1}$

$u^2+10u+9=0$

$(u+9)(u+1)=0$

$u=-9$ $u=-1$

$x^{-1}=-9$ $x^{-1}=-1$

$\frac{1}{x}=\frac{-9}{1}$ $\frac{1}{x}=-1$

$-9x=1$ $x=-1$ ✓

$x=-\frac{1}{9}$

$\frac{1}{x^2}+\frac{10}{x}+9=0$

$\frac{1}{(-1/9)^2}+\frac{10}{(-1/9)}+9=0$

$81-90+9=0$

$0=0$

5. $\frac{1}{(x-1)^2}-\frac{1}{(x-1)}-2=0$ $u=\frac{1}{x-1}$

$u^2-u-2=0$

$(u+1)(u-2)=0$

$u=-1$ $u=2$

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

$-x+1=1$ $2x-2=1$

$-x=0$ $2x=3$

$x=0$ $x=3/2$

6. $2x-5\sqrt{x}+3=0$ $u=\sqrt{x}$

$2u^2-5u+3=0$

$(2u-3)(u-1)=0$

$u=3/2$ $u=1$

$\sqrt{x}=\frac{3}{2}$ $\sqrt{x}=1$

$x=\frac{9}{4}$ ✓ $x=1$ ✓

$2(\frac{9}{4})-5\sqrt{\frac{9}{4}}+3=0$

$\frac{9}{2}-\frac{15}{2}+\frac{6}{2}=0$

$0=0$ ✓

7. $(x^2-x)^2-8(x^2-x)+12=0$

$u=x^2-x$

$u^2-8u+12=0$

$(u-6)(u-2)=0$

$u=6$ $u=2$

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

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

$(x-3)(x+2)=0$ $(x-2)(x+1)=0$

$x=3,-2$ $x=2,-1$

8. $2^{(2x-5)^3}=16^{(2x-5)}$ $u=2x-5$

$2^{u^3}=16^u$

$2^{u^3}=(2^4)^u$

$2^{u^3}=2^{4u}$

$u^3=4u$

$u^3-4u=0$

$u(u^2-4)=0$

$u(u+2)(u-2)=0$

$u=0,-2,2$

$2x-5=0$ $x=5/2$

$2x-5=-2$ $2x=3$ $x=3/2$

$2x-5=2$ $2x=7$ $x=7/2$

9. $\sqrt{2x+7}-x=2$

$\sqrt{2x+7}=x+2$

$2x+7=x^2+4x+4$

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

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

$x=-3$, $x=1$ ✓

$\sqrt{2(-3)+7}-(-3)=2$

$1+3\neq 2$

$x=-3$ extraneous soln.