Name: Solutions. **Precalc 12**

USUAL EQUATIONS - worksheet

1. Solve.

a) $2-3(x+1)=5(x+3)$

$2-3x-3=5x+15$

$-16=8x$

$\boxed{x=-2}$

b) $(2x+3)(x-5)=2x^2-6x+1$

$2x^2-10x+3x-15=2x^2-6x+1$

$-7x-15=-6x+1$

$\boxed{-16=x}$

c) $\frac{3}{7}x-5=\frac{2}{3}(x+1)$

$\frac{3}{7}x-5=\frac{2}{3}x+\frac{2}{3}$

$9x-105=14x+14$

$-119=5x$

$\boxed{x=-\frac{119}{5}}$

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

$5(x-3)=4(x+2)$

$5x-15=4x+8$

$\boxed{x=+23}$

2. Solve (try to vary the methods used):

a) $x^2+5x+4=0$

$(x+4)(x+1)=0$

$\boxed{x=-4 \text{ et } x=-1}$

b) $6x^2-7x-5=0$

$\Delta=169$

$x=\frac{7\pm13}{12}$ → $\boxed{-\frac{1}{2}}$; $\boxed{\frac{5}{3}}$

c) $3(x-5)^2-27=0$

$3(x-5)^2=27$

$(x-5)^2=9$

$x-5=\pm3$

$x=5\pm3$ → $\boxed{2}$; $\boxed{8}$

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

$6x^2+4x-3x-2-1=0$

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

$\Delta=1-4(6)(-3)=73$

$\boxed{x=\frac{-1\pm\sqrt{73}}{12}}$ ← exact value

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3. Solve algebraically

a) $|x^2 - 2x| = 1$

$x^2-2x=1$ or $-x^2+2x=1$

$x^2-2x-1=0$ $\quad x^2-2x+1=0$

$\Delta = 4+4=8$ $\quad (x-1)^2=0$

$x=\frac{2\pm\sqrt{8}}{2}=1\pm\sqrt{2}$ $\quad x=1$

⚠ TESTS ... or restr

3 Sol : $1\pm\sqrt{2}$ & 1

b) $|x+5| = 4x-1$

$x+5=4x-1$ or $-x-5=4x-1$

$6=3x$ $\quad -4=5x$

$x=2$ $\quad x=-\frac{4}{5}$

TESTS or... $x=2$ ✓ $\quad x=-\frac{4}{5}$ ✗

Sol : {2}

c) $\frac{4x-1}{x+2}-\frac{x+1}{x-2}=\frac{x^2-4x+24}{x^2-4}$

- Restr : $D=\mathbb{R}\setminus\{\pm2\}$
- $(4x-1)(x-2)-(x+1)(x+2)=x^2-4x+24$

$4x^2-8x-x+2-(x^2+2x+x+2)=x^2-4x+24$

$4x^2-9x+2-x^2-3x-2-x^2+4x-24=0$

$2x^2-8x-24=0$

$x^2-4x-12=0$

$(x-6)(x+2)=0$

$x=6$ $\quad x\neq 2$ restr

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

- Restr : $x\neq\pm1$
- $(x^2+x+2)(x-1)-x(x+1)(x-1)=x^2-5$

$x^3-x^2+x^2-x+2x-2-x(x^2-1)=x^2-5$

$x^3+x-2-x^3+x=x^2-5$

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

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

$x=3$ $\quad x\neq -1$

e) $4+\sqrt{x-1}=x-3$

- Restr : $x-1\geq 0$ $\quad x\geq 1$
- $\sqrt{x-1}=x-7$

$x-1=x^2-14x+49$

$x^2-15x+50=0$

$(x-5)(x-10)=0$

$x=5$ $\quad x=10$

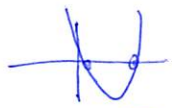
⚠ TESTS :

$4+\sqrt{x-1}=x-3$		$4+\sqrt{x-1}=x-3$	
$4+\sqrt{4}$	$5-3$	$4+\sqrt{9}$	$10-3$
6	2 ✗	7	7 ✓

Sol : $x=10$

f) $\sqrt{x^2-10x+1}=5$

- Restr : $x^2-10x+1\geq 0$



$x\leq 5-2\sqrt{6}$ or $x\geq 5+2\sqrt{6}$

- $x^2-10x+1=25$

$x^2-10x-24=0$

$(x-12)(x+2)=0$

$x=12$ $\quad x=-2$

⚠ TESTS ✓ and ✓

Sol : -2 & 12