1.5 notes (part 2)

Extraneous solution:
a solution that emerges from the process of solving an equation but is not valid.

1.5 notes (part 2)

$$4\sqrt{2y-1}-2=0$$

Solving a radical equation:

1. isolate the radical(s)
2. square (or cube) both sides
3. combine like terms and set = 0
4. factor and solve

$$\sqrt[3]{2x+1}+5=8$$

$$\sqrt{5x-1}-2\sqrt{x+1}=0$$

1.5 notes (part 2)

think :

$x^2 + 3x - 10$

$(x+5)(x-2)$

Factor and solve:

4 possible solutions

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

$$(x^2+5)(x^2-2)=0$$

$x^2+5=0$

$x^2=-5$

$\cancel{x=\pm\sqrt{-5}}$

no real solution (extraneous)

$x^2-2=0$

$x^2=2$

$\boxed{x^2=\pm\sqrt{2}}$ two solutions

5. $\sqrt{2x} + \cancel{x} = 0$

$\quad\quad\quad\quad\;\, \cancel{-x} \quad -x$

isolate variable, then square both sides to maintain proper order of operations

$$\sqrt{2x} = -x$$

$$\left(\sqrt{2x}\right)^2 = (-x)^2$$

$$2x = x^2$$

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

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

gather like terms, Keep leading term positive so it is easier to factor

check in original equation $\boxed{x=0}$

$\cancel{x=2}$ extraneous solution

makes original equation false

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

$x(x+2)$

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

$3x + 6 + 5x = 2x^2 + 4x$

$\cancel{8x} + \cancel{6} = 2x^2 + 4x$

$-8x \quad -6 \qquad -8x \quad -6$

$0 =$

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

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

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

$\boxed{x = 3}$ $\boxed{x = -1}$

90. $(x+2)(x-2)\left(\dfrac{x+5}{\cancel{x-2}}\right)=\left(\dfrac{5}{x+2}+\dfrac{28}{x^2-4}\right)(x+2)(x-2)$

same as $(x+2)(x-2)$

$$(x+2)(x+5)=5(x-2)+28$$

$$x^2+7x+10=5x-10+28$$

$$x^2+7x+10=5x+18$$

$$-5x\ -18\qquad -5x\ -18$$

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

$$(x+4)(x-2)=0$$

$\boxed{x=-4}$ $\qquad \cancel{x=2}$ ← makes denominator zero, so original equation is undefined.

extraneous

98. $\sqrt{5-x}+\cancel{1}=x-2$

$-1 \qquad -1$

$$\left(\sqrt{5-x}\right)^2=(x-3)^2 \qquad (x-3)(x-3)$$

$$5-x=x^2-6x+9$$

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

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

$$\boxed{x=4} \qquad \cancel{x=1}$$

$$\sqrt{4}+1=1-2$$

$$2+1\neq 1-2$$

1.5 check even answers:

90. $x = -4$ only

$x = 2$ makes the fraction undefined

so it is an extraneous solution

104. factor to get $(x^2 - 4)(x^2 - 1) = 0$

then solve $\rightarrow$ $x = \pm 2$

$x = \pm 1$

106. factor to get $(x^3 - 3)(x^3 + 1) = 0$

then solve $\rightarrow$ $x = \sqrt[3]{3}$

$x = -1$