MTH-PC Pre-calculus Session 6 9/28

$$\frac{1}{\boxed{x+4}} + \frac{2x-3}{\boxed{x^2+4x}} = \frac{1}{\boxed{x}}$$

Find common denominator

$$x^2+4x$$

$$x(x+4)$$

$$x \cdot \boxed{\frac{1}{x+4}} + \frac{2x-3}{x(x+4)} = \boxed{\frac{1}{x}}\begin{matrix}(x+4)\\(x+4)\end{matrix}$$

$$x \cdot$$

$$\frac{x}{x(x+4)} + \frac{2x-3}{x(x+4)} = \frac{x+4}{x(x+4)}$$

$$x(x+4) \neq 0$$

$$x \neq 0 \qquad x+4 \neq 0$$

$$-4 \quad -4$$

$$x \neq -4$$

$$x + 2x - 3 = x + 4$$

$$3x - 3 = x + 4$$

$$-x \qquad -x$$

$$2x - 3 = 4$$

$$+3 \quad +3$$

$$\frac{2x}{2} = \frac{7}{2}$$

$$\boxed{x = \frac{7}{2}}$$

$$\frac{a-5}{a+2} - \frac{a-3}{3a+6} = 1$$

$$3(a+2) \rightarrow 3a+6$$

$$\frac{3(a-5)}{3(a+2)} - \frac{a-3}{3a+6} = \frac{1}{1}\frac{(3a+6)}{(3a+6)}$$

$$\frac{3(a-5)}{3(a+2)} \boxed{- \frac{a-3}{3a+6}} = \frac{3a+6}{3a+6}$$

$$3(a-5) - (a-3) = 3a+6$$

$$3a-15-a+3 = 3a+6$$

$$2a-12 = 3a+6$$

$$-2a \qquad -2a$$

$$-12 = a+6$$

$$-6 \qquad -6$$

$$\boxed{-18 = a}$$

Restriction?

$$3a+6 \neq 0$$

$$-6 \quad -6$$

$$\frac{3a}{3} \neq \frac{-6}{3}$$

$$a \neq -2$$

$$-404 = -5(3k+105)^{4/3} + 1$$
$$-1 \qquad\qquad -1$$

$$\frac{-405}{-5} = \frac{-5(3k+105)^{4/3}}{-5}$$

$$\left(81\right)^{3/4} = \left((3k+105)^{4/3}\right)^{3/4}$$

$$27 = 3k+105$$
$$-105 \qquad -105$$

$$\frac{-78}{3} = \frac{3k}{3}$$

$$\boxed{k=-26}$$

exponent

$$81^{3/4}$$

root

$$\sqrt[4]{81^3} \qquad \left(\sqrt[4]{81}\right)^3$$

recommend rooting first!

$$\left(\sqrt[4]{81}\right)^3 = (3)^3 = 27$$

Restriction? No

$$(3k+105)^{4/3}$$

if even root, then cannot be $\ominus$

if odd root, no worries

Think:

$$\frac{5}{3}\left(\frac{3}{5}x\right) = (6)\frac{5}{3}$$

No restrictions

$$\{-4(m-13)^{3/5} + 5 = -27$$
$$-5 \qquad -5$$

root

$$\frac{-4(m-13)^{3/5}}{-4} = \frac{-32}{-4}$$

$$\left((m-13)^{3/5}\right)^{5/3} = (8)^{5/3}$$

$$m-13 = 8^{5/3}$$

$$m-13 = 32$$
$$+13 \quad +13$$

$$\boxed{m=45}$$

$$-4\left(\boxed{m-13}\right)^{3/5}+5=-27$$

u - substitution

$u = m - 13$

$$-4u^{3/5}+5=-27$$

solve u $\longrightarrow$ solve m.

Restrictions

1.) Is there a fraction with variable in the denominator.

$\sqrt{} = \sqrt[2]{}$

2.) Even numbered roots

$$\left(\sqrt{2n+14}\right)^2=\left(\sqrt{-1-n}\right)^2$$

$$2n+14=-1-n$$

$+n \qquad +n$

$$3n+14=-1$$

$-14 \quad -14$

$$\frac{3n}{3}=\frac{-15}{3}$$

$$\boxed{n=-5}$$

$2n+14\geq 0 \qquad -1-n\geq 0$

$2(-5)+14\geq 0 \qquad -1-(-5)\geq 0$

$-10+14\geq 0 \qquad -1+5\geq 0$

$\checkmark\ 4\geq 0 \qquad \checkmark\ 4\geq 0$

$$\left(\sqrt{-2n}\right)^2 = (n+7)^2$$

$$-2n = (n+7)(n+7)$$

$$-2n = n^2+7n+7n+49$$

$$-2n = n^2+14n+49$$

$$+2n \qquad +2n$$

$$0 = n^2+16n+49$$

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$\frac{-16 \pm \sqrt{(16)^2-4(1)(49}}{2(1)}$$

$$\frac{-16 \pm \sqrt{256-196}}{2}$$

$$\frac{-16 \pm \sqrt{60}}{2}$$

$$\frac{-16 \pm 2\sqrt{15}}{2} = \boxed{-8 \pm \sqrt{15}}$$

$$\left\{\boxed{-8+\sqrt{15}}, \boxed{-8-\sqrt{15}}\right\}$$

Restrictions?

$\sqrt{-2n}$ $\quad -2n \geq 0$

$\ominus$

Absolute Value

Distance from a number to zero on the number line.

$|5| = 5 \qquad |-5| = 5$

$$|2x+7| = 5$$

$5 \qquad -5$

$$2x+7=5 \qquad 2x+7=-5$$

$$-7 \quad -7 \qquad -7 \quad -7$$

$$\frac{2x}{2} = \frac{-2}{2} \qquad \frac{2x}{2} = \frac{-12}{2}$$

$$\boxed{x=-1} \qquad \boxed{x=-6}$$

$|x-3| = -1$ $\boxed{\text{No solution}}$

$$\frac{-3|x-3|}{-3} = \frac{-6}{-3}$$

$$|x-3| = 2$$

$$x-3=2 \qquad\qquad x-3=-2$$
$$+3 \quad +3 \qquad\qquad +3 \quad +3$$
$$\boxed{x=5} \qquad\qquad \boxed{x=1}$$

$$|\boxed{x+7}| = 2x+8$$

must be positive

$$x+7=2x+8$$
$$-7 \qquad -7$$
$$x = 2x+1$$
$$-2x \quad -2x$$
$$\frac{-x}{-1} = \frac{1}{-1}$$
$$\boxed{x=-1}$$

$2(-1)+8$
$-2+8$
6

$$x+7 = -(2x+8)$$

$2(-5)+8$
$-10+8$
-2

$$x+7 = -2x-8$$
$$+2x \qquad +2x$$
$$3x+7=-8$$
$$-7 \qquad -7$$
$$\frac{3x}{3} = \frac{-15}{3}$$
$$\boxed{x=-5}$$

$$|5x-1| + 7 = 3x$$
$$-7 \qquad -7$$

$$|5x-1| = 3x-7$$

$$5x-1 = 3x-7$$
$$-3x \qquad -3x$$
$$2x-1 = -7$$
$$+1 \qquad +1$$
$$\frac{2x}{2} = \frac{-6}{2}$$
$$\cancel{x = -3}$$

Restrictions

$$3x-7$$
$$3(-3)-7$$
$$-9-7$$
$$-16$$

$$5x-1 = -3x+7$$
$$+1 \qquad +1$$
$$5x = -3x+8$$
$$+3x \qquad +3x$$
$$\frac{8x}{8} = \frac{8}{8}$$
$$\cancel{\boxed{x=1}}$$

$$3x-7$$
$$3x-7$$
$$3(1)-7$$
$$3-7$$
$$-4$$

No solution

ns