Wednesday, January 30, 2019 1:53 PM

Check: $\boxed{x=2}$: $\left[\underbrace{(2)^2+6\cdot 2-7}\right]^{\frac{3}{2}} \stackrel{?}{=} 27$

a solution

$(9)^{\frac{3}{2}} \stackrel{?}{=} 27$

$(\sqrt{9})^3 \stackrel{?}{=} 27$

$(3)^3 = 27$ ✓

$\boxed{x=-8}$: $\left[(-8)^2+6\cdot(-8)-7\right]^{\frac{3}{2}} \stackrel{?}{=} 27$

a solution

$(9)^{\frac{3}{2}} = 27$ ✓

Solution set: $\boxed{\{2, -8\}}$

Ex. Solve: $(2x-5)^{\frac{2}{5}} = 9$

$$2x - 5 = (9)^{\frac{5}{2}} = (\sqrt{9})^5 = (3)^5 = 243$$

$$2x = 248$$

$$x = 124.$$

Check: HW.

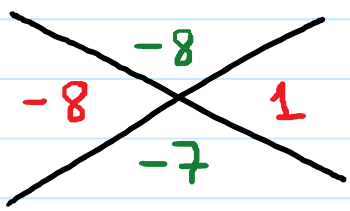
Wednesday, January 30, 2019 2:01 PM

III Equations that are quadratic in form.

Solve: $\overset{u^2}{\boxed{x^6}} - 7\overset{u}{\boxed{x^3}} - 8 = 0$

Let $u = x^3$. Then: $u^2 = (x^3)^2 = x^6$

After this u-substitution, the original equation becomes: $u^2 - 7u - 8 = 0$



$(u-8)(u+1) = 0$

$u = 8$; $u = -1$

So, this tells us that

$x^3 = 8$ or $x^3 = -1$

$\downarrow$ $\downarrow$

$x = \sqrt[3]{8}$ $x = \sqrt[3]{-1}$

$\downarrow$ $\downarrow$

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

Wednesday, January 30, 2019 2:09 PM

Ex. Solve: $x - 2\sqrt{x} - 8 = 0$

$$-2\sqrt{x} = -x + 8$$

$$\sqrt{x} = \frac{1}{2}x - 4 \quad \text{(Isolate radical)}$$

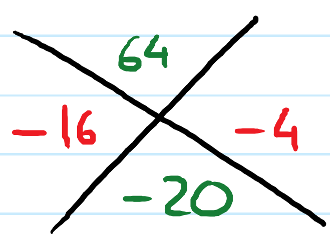
$$x = \left(\frac{1}{2}x - 4\right)^2 \quad \text{(Square both sides)}$$

$$x = \frac{1}{4}x^2 - 2\cdot\frac{1}{2}x\cdot 4 + 16$$

$$x = \frac{1}{4}x^2 - 4x + 16$$

$$0 = \frac{1}{4}x^2 - 5x + 16$$

$$0 = x^2 - 20x + 64$$



$$0 = (x-16)(x-4)$$

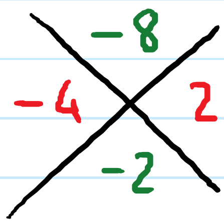
$x = 4$; $x = 16$ → check!

2nd way to solve:

$$\underbrace{\boxed{x}}_{u^2} - 2\overbrace{\boxed{\sqrt{x}}}^{u} - 8 = 0$$

Let $u = \sqrt{x}$. Then $u^2 = x$

Equation becomes: $u^2 - 2u - 8 = 0$



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

$u = 4$; $u = -2$.

$\sqrt{x} = 4$; $\sqrt{x} = -2$.

$x = 16$; $x = 4$ $\rightarrow$

HW: Check solution