4.2 Pt. 2 Solving Radical Equations Algebraically

To Solve Algebraically:

① Isolate the radical

② Raise both sides to a power equal to the index

③ Solve

④ Check for extraneous roots

① Solve

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

$\sqrt{x+1}^2 = 2^2$

$x+1 = 4$

$\boxed{x = 3}$

* Don't forget to check

6) $x = \sqrt{x+10} + 2$

$(x-2)^2 = \sqrt{x+10}^2$

$(x-2)(x-2) = x+10$

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

$x^2 - 5x - 6 = 0$

$0 = (x-6)(x+1)$

$x = 6$ $x = -1$

Check ✓   Check X

$\boxed{x = 6}$

c) $\sqrt{5x^2 - 2} - x = 3$

$\sqrt{5x^2 - 2} = x + 3$

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

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

$4x^2 - 6x - 11 = 0$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \dfrac{6 \pm \sqrt{36 - 4(4)(-11)}}{8}$

$x = \dfrac{6 \pm \sqrt{212}}{8}$

$x = 2.57, -1.07$

$$\boxed{x = 2.57, -1.07}$$

Check

$x = 2.57, -1.07$ ✓ ✓

d) $\sqrt[3]{x+5} + 2 = 0$

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

$(-2)^3 = (\sqrt[3]{x+5})^3$

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

$-8 = x+5$

$-8-5 = x$

$x = -13$

Check ✓

$$\boxed{x = -13}$$

② Determine the x-intercept(s) of $f(x) = \sqrt{2x-3} + x - 3$.

Check your solutions

$0 = \sqrt{2x-3} + x - 3$

$-x + 3 = \sqrt{2x-3}$

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

$x^2 - 6x + 9 = 2x - 3$

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

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

$x = 6 \qquad x = 2$

Check x   Check ✓

$\boxed{(2,0)}$ or $\boxed{x = 2}$

By 173
4(a,b,c,f)
6 (algebraically)