The Contest

June 8th, 2017

The Contest (Simulation)

Using only the operations $+$, $-$, $\times$, $/$ and nth roots, solve the following:

1. $x^4 + 3x^2 = 28$
2. $x^4 + 12 = 7x^2$
3. $x^3 + 24 = 10x$
4. $x^3 + 9 = 12x$
5. $x^3 + 21 = 2x$
6. $x^3 + 72 = 11x^2$
7. $x^3 + 6x^2 + 3x = 18$
8. $x^3 + 6x = 20$
9. $x^3 = 15x + 4$
10. $x^3 + px = q$ where $p, q > 0$.

Solutions (Real Roots)

1. $x^4 + 3x^2 = 28$ Solutions: $x = \pm 2$
2. $x^4 + 12 = 7x^2$ Solutions: $x = \pm 2, \pm\sqrt{3}$
3. $x^3 + 24 = 10x$ Solutions: $x = -4$
4. $x^3 + 9 = 12x$ Solutions: $x = 3, -3/2 \pm \sqrt{21/4}$
5. $x^3 + 21 = 2x$ Solutions: $x = -3$
6. $x^3 + 72 = 11x^2$ Solutions: $x = 4 \pm \sqrt{40}, 3$
7. $x^3 + 6x^2 + 3x = 18$ Solutions: $x = (3 \pm \sqrt{33})/2, -3$
8. $x^3 + 6x = 20$ Solutions: $x = 2$
9. $x^3 = 15x + 4$ Solutions: Later
10. $x^3 + px = q$ where $p, q > 0$. Solutions: Later