17. (a) Write \((x^{12} - 3)(x^4 + 6)\) as a composition \(f(g(x))\) of two polynomials \(f(x)\) and \(g(x)\) of lower degree. \(g(x)\) is the inner function.

\[
g(x) = \text{chk}=4
\]

\[
f(x) = \text{chk}=12
\]

17. (b) Write \(\frac{\sqrt{2+x}}{3}\) as a composition \(f(h(g(x)))\) of three nontrivial simpler functions \(f(x), h(x),\) and \(g(x)\).

The functions must not be the trivial function \(x\). Hence \(g(x) = x\) is always a wrong answer.

\(g(x)\) is the innermost function, find it first. Circle it.

\(h\) applies next. To find \(h\), look at the circled inner function, and ask what happens next to this inner function?

\(f\) is the outermost. It does what remains to be done after \(g\) and \(h\) have been applied.

\(f(x) = \frac{\sqrt{2+x}}{3}\) is wrong. \(f\) does only the remaining step, not all the accumulated steps.

Of the functions \(g, h, f\), two have 3 symbols, one has 2 symbols.

\[
g(x) = \text{3 sym}
\]

\[
h(x) = \text{2 sym}
\]

\[
f(x) = \text{3 sym}
\]

17. (c) Write \(3\sqrt{1+x^2} - \frac{2}{1+x^2}\) as a composition \(f(h(g(x)))\) of three nontrivial simpler functions \(f(x), h(x),\) and \(g(x)\).

\[
g(x) = \text{2 sym}
\]

\[
h(x) = \text{3 sym}
\]

\[
f(x) = \text{7 sym}
\]

1. To get back \(x\) from \(x + 2\), you have to subtract 2.

Hence the inverse of \(x + 2\) is \(x - 2\).

To get back \(x\) from \(3x\), you have to divide by 3.

Hence the inverse of \(3x\) is \(x/3\).

To get back \(x\) from \(\sqrt[3]{x}\), you have to ?

Hence the inverse of \(\sqrt[3]{x}\) is \(2\ text{sym}\).