7. Estimate as a power of 10: \(2^{50} \approx\)

First write \(2^{50}\) as a power of \(2^{10}\), e.g. \((2^{10})^n\).
Then use the approximation \(2^{10} \approx 10^3\).
4 symbols, chk=7.

9. Simplify to at most 3 symbols.

(a) \(\left(\sqrt[3]{5}\right)^{\sqrt{5}} = \)

Initially, leave the radical \(\sqrt[3]{5}\) alone.
Recall that nested exponents multiply.
1st get rid of the radical in the exponent.
2nd get rid of the radical \(\sqrt[3]{5}\) in the base.
The answer is a two-digit integer. 2 symbols, chk=9.

(b) \(\frac{\sqrt[3]{1 + \sqrt{2}}}{\sqrt[3]{1 - \sqrt{2}}} = \)

Bring the denominator upstairs by negating its exponent.
Simplify the combined exponent.
Get rid of the radical \(\sqrt[3]{5}\).
The answer has an integer in the base, a radical in the exponent.
3 symbols, chk=5.

Gateway problems

Solve for \(x\)

First write \(\frac{121}{\sqrt{11}}\) as a power of 11. Hint: \(\sqrt[3]{11} = 11^{1/3}\), \(11^2 = 121\), \(\sqrt{11} = 11^{1/2}\).

A. \(\left(\sqrt[3]{11}\right)^{2x-2} = \frac{121}{\sqrt{11}}\)

4 symbol fraction, chk=8.

B. \(\left(\sqrt[4]{x}\right)^4 = \frac{121}{\sqrt{11}}\)

5 symbols, chk=19.