7. Estimate as a power of 10: \(2^{50} \approx \)
First write \(2^{50}\) as a power of \(2^{10}\), e.g. \((2^{10})^5\). Then use the approximation \(2^{10} \approx 10^3\). 4 symbols, chk=7.
\(2^{50} \approx \)

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

9. Simplify to at most 3 symbols. (b) \(\sqrt[3]{3}^{1+\sqrt{2}}/\sqrt[3]{3}^{1-\sqrt{2}}\)
Bring the denominator upstairs by negating its exponent.
Simplify the combined exponent.
Get rid of the radical \(\sqrt[3]{3}\).
The answer has an integer in the base, a radical in the exponent. 3 symbols, chk=5.
\(\sqrt[3]{3}^{1+\sqrt{2}}/\sqrt[3]{3}^{1-\sqrt{2}} = \)

Gateway problems
Hints: \(\sqrt[11]{11} = 11^{1/3}, 11^2 = 121, \sqrt[11]{11} = 11^{1/2}\).

Solve for \(x\). First write \(\sqrt[11]{121} = 11\) as a power of 11. chk=7
\(\frac{121}{\sqrt[11]{11}} = \)

Write both sides to base 11, equate the exponents.

B. \((\sqrt[3]{x})^4 = \frac{121}{\sqrt[11]{11}}\) 5 symbols, chk=19.