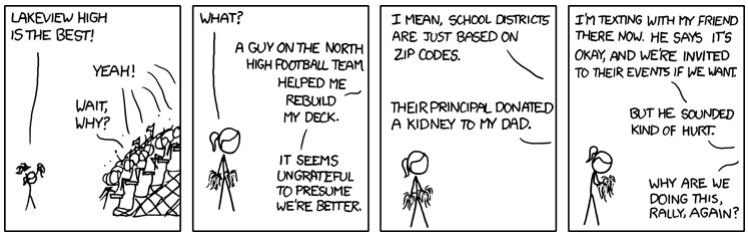
Worksheet 19: Review

Russell Buehler
b.r@berkeley.edu



www.xkcd.com

1. Use linear approximation or differentials to approximate 2.001^3.

2. Find all the critical numbers of the function $f(x) = x\ln(x)$.

3. Find the derivative of $t(\theta) = \tanh^{-1}(5\theta^6)$

4. Find the absolute minimum and maximum of $g(q) = 2^q$ in the interval $(0, 5)$.

5. Find $\frac{dy}{dx}$ by implicit differentiation: $e^{\frac{x}{y}} = x - y$

6. Find the derivative of $t(\theta) = \cosh(3x^2)$

7. Find all the critical numbers of the function $f(x) = 5$.

8. Find the absolute minimum and maximum of $f(x) = x^2 - 2x$ in the interval $[0, 3]$.

9. ($\star$) (True or False) and why.

   (a) If $f(x) = (x^6 - x^4)^5$, then $f^{(31)}(x) = 0$

   (b) The derivative of a rational function is a rational function.

   (c) If $g(x) = x^5$, then $\lim_{x \to 2} \dfrac{g(x) - g(2)}{x - 2} = 80$