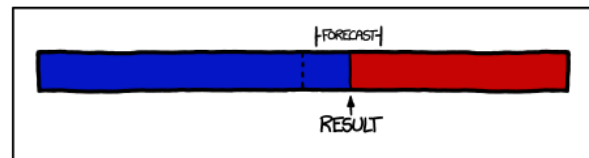


Worksheet 25: Newton's Method

Russell Buehler

b.r@berkeley.edu



BREAKING: TO SURPRISE OF PUNDITS, NUMBERS CONTINUE TO BE BEST SYSTEM FOR DETERMINING WHICH OF TWO THINGS IS LARGER.

www.xkcd.com

1. Use Newton's method starting with $x_1 = -1$ to find x_3 the third approximation of the root of $x^7 + 4 = 0$.

2. Use Newton's method to approximate $\sqrt[100]{100}$ to 4 decimal places.

3. Use Newton's method to find the roots of $\frac{1}{x} = 1 + x^3$ to 3 decimal places.

4. Find the most general anti-derivative:

(a) $f(x) = \frac{1}{2}x^2 - 2x + 6$

(b) $f(x) = x(2 - x)^2$

(c) $y = e^2$

(d) $f(x) = \sqrt[3]{x^2} + x\sqrt{x}$

(e) $r(\theta) = \sec(\theta) \tan(\theta) - 2e^\theta$

(f) $f(x) = \frac{2x}{1+x^2}$

5. Find f

(a) $f''(x) = 8x^3 + 5, f(1) = 0, f'(1) = 8$

(b) $f''(t) = 2e^t + 3\sin(t), f(0) = 0, f'(\pi) = 0$

(c) $f'''(x) = \cos(x), f(0) = 1, f'(0) = 2, f''(0) = 3$