Source: [KBe]-2020math401-index

Rate of Change (1, chemical reaction)

1. Average rate of change (slope) between $t = 20$ and $t = 30$ is 0.615
2. $f(x) = \frac{(A_0(1-\exp(-k(x+p)))-A_0(1-\exp(-k(x))))}{p}$
    1. Show that it looks like the tangent at $x = 25$: $y = f(25)(x - 25) + 51.444$
3. Desmos Graph

Rate of Change (2, washing machines)

1. Average cost for 100 machines = $\frac{11000}{100} = 110$
2. Derivative is $y = -0.2x + 100$, so we get 80
3. By hard coding the numbers, we get $\left(2000 + 100 \cdot 101 - 0.1(101)^2\right) - \left(\left(2000 + 100 \cdot 100 - 0.1(100)^2\right)\right) = 79.9$ which is roughly 80
4. Demos Graph

Terminology

(slide 13 is confusing, see questions.**)**

Limits

1. Eq $\frac{x^3-1}{x-1} \Rightarrow \{x^2 + x + 1 : x \neq 1\}$

Limits Practice

1. $\lim_{x\to 10} 2x + 5 = 25$
2. $\lim_{x\to -2} \frac{x^2-x-6}{x-2} = -5$
3. $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} \Rightarrow * \frac{\sqrt{x}+2}{\sqrt{x}+2} \Rightarrow \sqrt{x} + 2 = 4$
4. $\lim_{x\to 0} \frac{sinx}{x}$: $sinx = x$ for small x (SHM), so we can treat it like $\frac{x}{x}$ #todo
5. $\lim_{x\to 0} sin\frac{1}{x}$ Keeps changing… Not sure how to evaluate. #todo
6. $\lim_{x\to 2} \lfloor x \rfloor$
