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. $f\left(x\right) = \frac{\left(A_0\left(1 - \exp\left(-k(x+p)\right)\right) - A_0\left(1 - \exp\left(-k(x)\right)\right)\right)}{p}$

   1. Show that it looks like the tangent at $x = 25$: $y = f\left(25\right)\left(x - 25\right) + 51.444$

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 $\left(2000 + 100 \cdot 101 - 0.1\left(101\right)^2\right) - \left(\left(2000 + 100 \cdot 100 - 0.1\left(100\right)^2\right)\right) =$ 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. $\lim_{x \to 2} \lfloor x \rfloor$