

$$1a) f(n) = f(a) + f'(a)(n-a) + \frac{f''(a)}{2}(n-a)^2 \quad \checkmark$$

$$1b) J_h(1.2) = 0 + 1 \cdot (0.8) + \frac{1 \cdot (0.8)^2}{2} = 0.18 \quad \checkmark$$

$$2) V = \frac{1}{3} \pi r^3 \Rightarrow \frac{dV}{dt} = 3\pi r^2 \frac{dr}{dt} \quad \checkmark$$

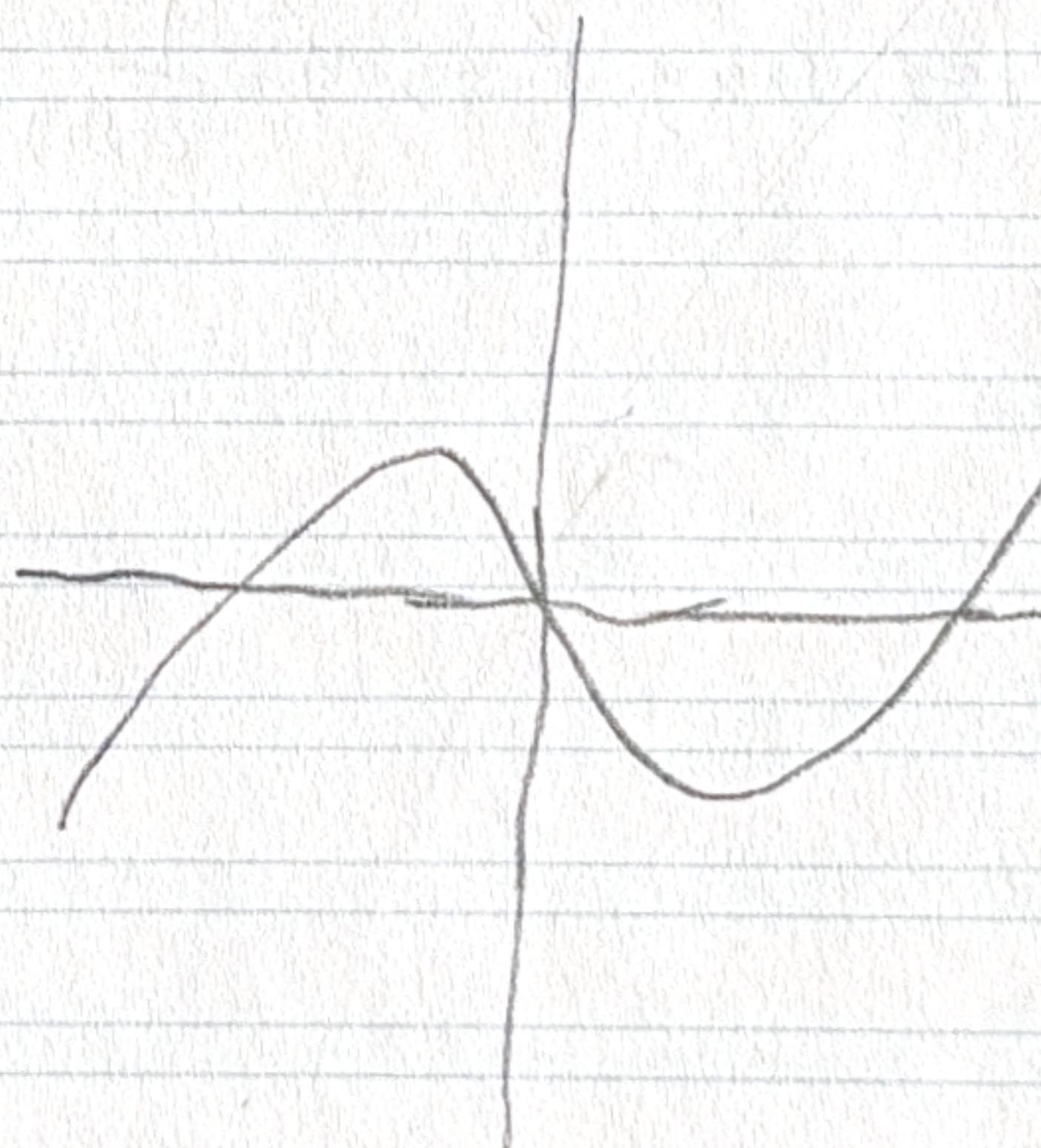
$$\Rightarrow 3\pi = 100\pi r' \Rightarrow r' = \frac{3}{100}$$

$$3) f(n) = n - 3n^{1/3} \quad \checkmark$$

$$f'(n) = 1 - n^{-2/3} \Rightarrow f' = 0 \Rightarrow n = 1$$

$$n \rightarrow \infty \Rightarrow f(n) \rightarrow \infty$$

$$n \rightarrow -\infty \Rightarrow f(n) \rightarrow -\infty$$



$$4) V = \pi r^2 h + \frac{2}{3} \pi r^3 \Rightarrow \cancel{\pi r^2 (h + \frac{2}{3} r)}$$

$$SA = 2\pi rh + 2\pi r^2 + \cancel{\pi r(2\pi r + 2\pi r)}$$

$$SA = 2\pi rh + 3\pi r^2 \Rightarrow h = 3r \Rightarrow h = 3 \frac{r}{h}$$

$$0 = 2\pi rh + 2\pi r^2 \Rightarrow h = -r \Rightarrow h = -\frac{r}{h}$$

4

$$5) SA = 3\pi r^2 + 2\pi rh \quad \checkmark$$

$$V = \frac{2}{3} \pi r^3 + \pi r^2 h$$

$$h = \frac{V - \frac{2}{3} \pi r^3}{\pi r^2}$$

$$\Rightarrow SA = \frac{5}{3} \pi r^2 + \frac{2V}{r} \Rightarrow SA' = \frac{10}{3} \pi r + \frac{-2V}{r^2} \Rightarrow V = \frac{5}{3} r^3$$

$$5) \text{ konvergenz } \frac{f}{f'} = \frac{n^3 - 3n + 7}{3n^2 - 3} \checkmark$$

$$2 - 1 = 1 \Rightarrow 1 - \text{undefined}$$

$$f(n) = 1 *$$

$$6) \frac{1}{2\sqrt{1+\frac{1}{n}}} < 1 + \frac{1}{2}n \Rightarrow f(n) < 1 + \frac{1}{2}n \checkmark$$