ØVING 6 [illegible]

1 a $D(x^5) = 5x^4$

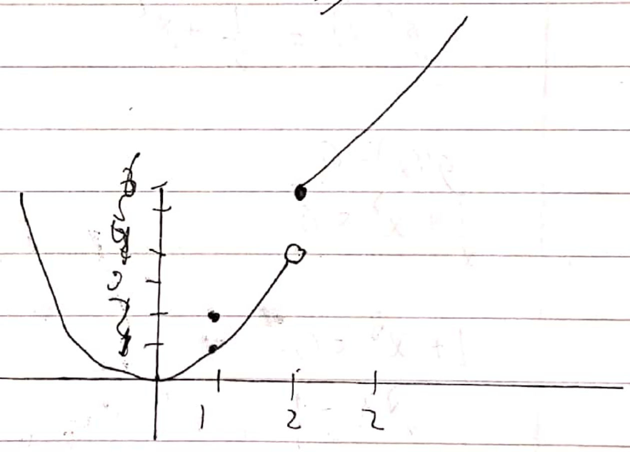
b $f(x) = \frac{1}{4}x^2$ $\quad f'(x) = \frac{1}{2}x$

c $\frac{d}{dx}5 = 0$

2 $\lim_{x \to 7} \frac{(x-7)^2 + 5(x-7)}{(x-7)(x-4)} = \frac{(x-7)((x-7)+5)}{(x-7)(x-4)}$

$\lim_{x \to 7} \frac{(x-7)+5}{(x-4)} = \frac{0+5}{7-4} = \frac{5}{3}$

3 $h(x) \begin{cases} x^2, & x > 2 \\ 3|x|, & x \leq 2 \end{cases}$



$H(2) = 3 \cdot |2| = 6$

$\lim_{x \to 2+} h(x) = 2^2 = 4$

ikke kont. i $h(x=2)$, så får to punkt $x=2$ ovenfor av nedenfor ($\lim_{x \to 2+}$ og $\lim_{x \to 2-}$)

4 $f(x) = \begin{cases} \sqrt{-x} & x < -1 \\ 1, & x = -1 \\ (x+1)^2 + 1, & x > -1 \end{cases}$

siden $\lim_{x \to -1-} = \lim_{x \to -1+} = f(-1)$ er grafen kontinuerlig i $x = -1$

$f(-1) = 1$

$\lim_{x \to -1-} f(x) = \sqrt{-(-1)} = \sqrt{1} = 1$

$\lim_{x \to -1+} f(x) = (-1+1)^2 + 1 = 0 + 1 = 1$

5

$g(x_0) = 0$

$g(x) = \log(x) + x^2$

$g(x_0) = 0$

$\log(x_0) + x_0^2 = 0$

$x_0^2 = -\log(x_0)$

$g(x) = \log(x) + x^2$

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

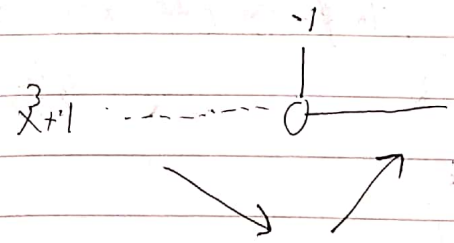
$g'(x) = 0$

$\frac{1}{x} + x^2 = 0$

$1 + x^3 = 0$

$x^3 = -1$

$x = -1^{\frac{1}{3}} = -1$



$g\left(\frac{1}{e}\right) = \ln e^{-1} + \frac{1}{e^2}$

$= -1 + \frac{1}{e^2}$

$\frac{1}{e^2} < 1$ kan vil si at

$\frac{1}{e^2} - 1 < 0$

$g(e) = \ln(e) + e^2 = 1 + e^2$

$1 + e^2 > 0$

så det finnes ~~et~~ nullpunkt mellom e^{-1} og e hvor $f(x_0) = 0$ en x_0

siden funksjonen er kontinuerlig mellom e^{-1} og e