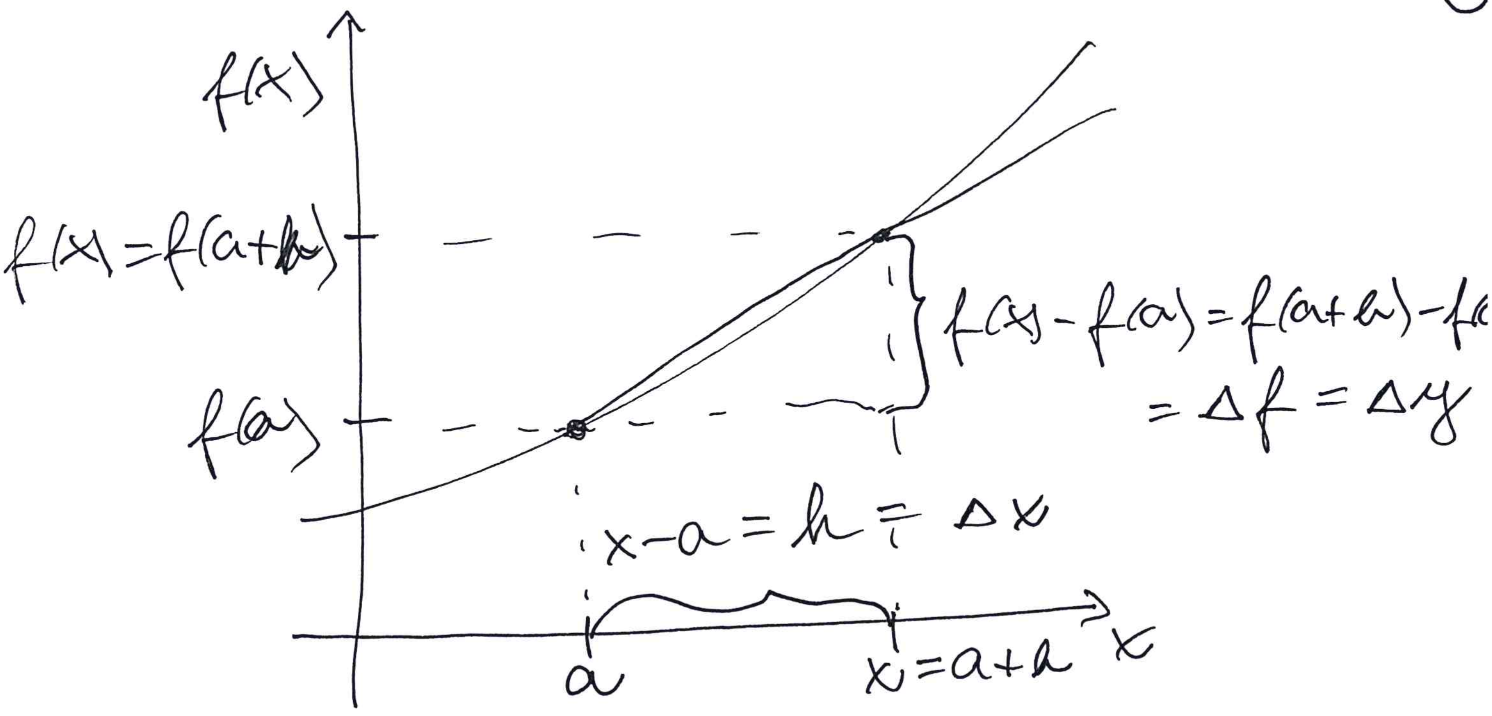
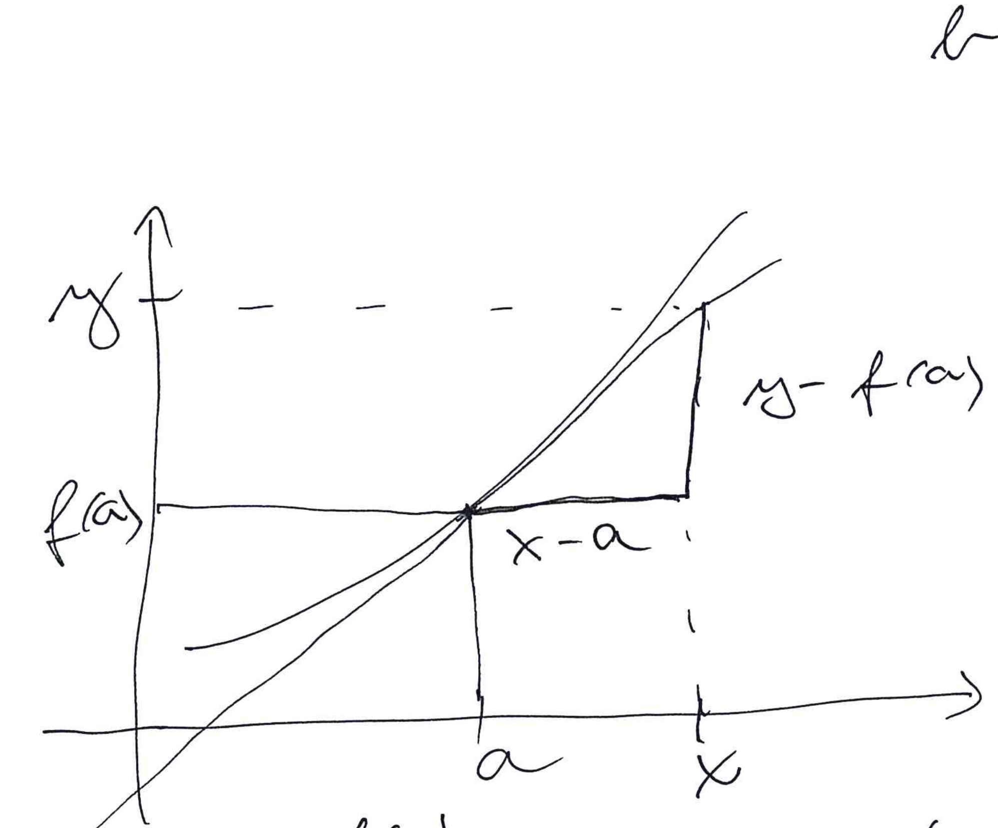


$f'(a)$ je $\frac{f(a+h)-f(a)}{h}$, dosadí po úpravě $h=0$



$$\frac{y-f(a)}{x-a} = f'(a) \quad / \cdot (x-a) \; + f(a)$$

$$y = f(a) + f'(a)(x-a)$$

1b $f(x) = 2x^2 - 5x + 1 \quad a = 2$

úkol: $f'(a)$

rovnice tečny v a

$$f'(a): \quad \frac{f(a+h) - f(a)}{h} = \frac{2(a+h)^2 - 5(a+h) + 1 - (2a^2 - 5a + 1)}{h}$$

$$\frac{2(a^2 + 2ah + h^2) - 5a - 5h + 1 - 2a^2 + 5a - 1}{h} =$$

$$= \frac{4ah + 2h^2 - 5h}{h} = 4a + 2h - 5$$

$h = 0$: $\quad f'(a) = 4a - 5$

$a = 2$: $\quad f'(a) = 3$

$f(a) = -1$

rovnice tečny: $\quad y = -1 + 3(x - 2)$

upravíme: $\quad y = 3x - 7$

1e

$$f(x) = 2x - 5 \qquad a = 4$$

$f'(a)$: $\quad f(a) = f(4) = 3$

$$f(a+h) = 2(a+h) - 5 =$$

$$2(4+h) - 5 =$$

$$= 8 + 2h - 5 = 3 + 2h$$

$$\frac{f(a+h) - f(a)}{h} = \frac{3 + 2h - 3}{h} = 2$$

závěr: $f'(4) = 2$

rovnice tečny:

$$y = f(a) + f'(a)(x - a)$$

$$y = 3 + 2(x - 4)$$

po úpravě:

$$y = 2x - 5 \quad (= f(x))$$

2a) $f(x) = x \qquad f'(a) = ?$

$$\frac{f(a+h)-f(a)}{h} = \frac{a+h-a}{h} = 1$$

závěr: $f'(x) = 1$

2d) $f(x) = k$

$$\text{– " –} = \frac{k-k}{h} = \frac{0}{h} = 0$$

2f) $(f+g)' = ?$

$$(f+g)(x) = f(x) + g(x)$$

$$(f+g)(a) = f(a) + g(a)$$

$$(f+g)(a+a) = f(a+a) + g(a+h)$$

$$(f+g)'(a) = \frac{f(a+a)+g(a+a) - (f(a)+g(a))}{h} =$$

$$= \frac{f(a+a)-f(a)}{h} + \frac{g(a+a)-g(a)}{h}$$

$h=0$: $(f+g)'(a) = f'(a) + g'(a)$

29 $(cf)' = ?$

$(cf)(a) = c\,f(a)$

$\to (cf)'(a) = \dfrac{cf(a+h) - cf(a)}{h} =$

$= c\,\dfrac{f(a+h) - f(a)}{h}$

$h \to 0: \quad c\,f'(a)$

$(cf)' = c\,f'$