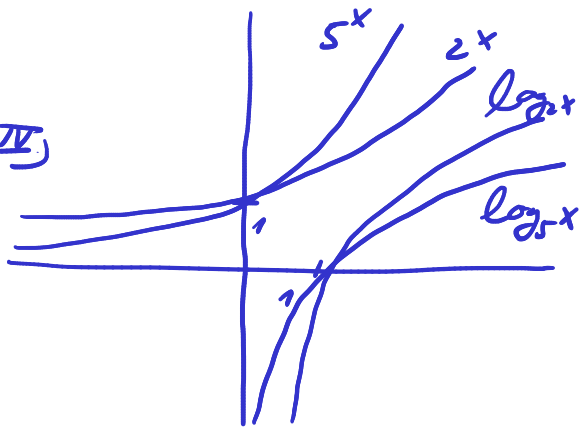
UKÁZKA 1

I.) 20, II.) $2x \cdot \sin x + x^2 \cdot \cos x$, III.) 3, IV.)



1.) C, 2.) B, 3.) A, 4.) D, 5.) A

6.) $x = 2,\ y = 2,\ z = 1$

7.) a) $D(f) = \mathbb{R} - \{-1\}$, b) $f \cap x \dots [0,0]$, $f \cap y \dots [0,0]$

c) $f'(x) = -\frac{x^2+2x}{(x+1)^2}$, d)

f'	$\ominus$	$\oplus$	$\oplus$	$\ominus$		
f	$\searrow$		$\nearrow$		$\nearrow$	$\searrow$
		-2		-1	0	

L. min. v $x = -2$

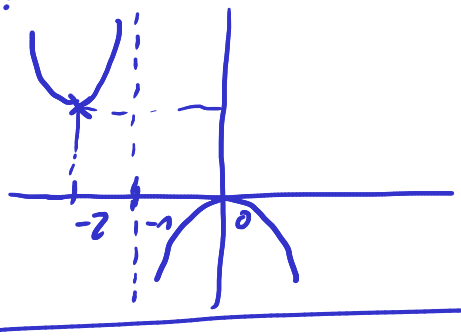
L. max. v $x = 0$

e)

f''	$\oplus$		$\ominus$	
f	$\cup$	-1		$\cap$

I.B. není ($-1 \notin D(f)$)

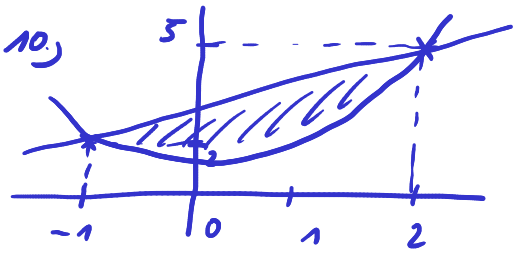
GRAF:



8.) (A) $\frac{1}{2x\sqrt{\ln x}} - 3x^2 \sin x^3$, (B) $4y e^{2x+y^2}$

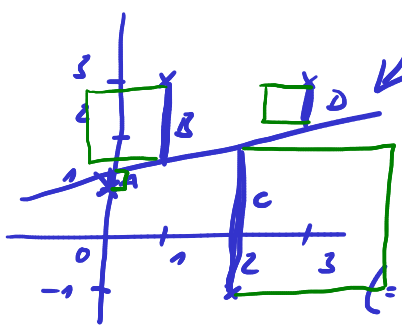
9.) (A) $\frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + c$, (B) $\frac{9}{2}\ln 3 - 2$

10.)



$$S = \int_{-1}^{2} x - x^2 + 2 \, dx$$

11.) $y = \frac{x}{5} + \frac{6}{5}$



METODA VÝBĚRU PŘÍMKY TAK, ABY SOUČET KVADRÁTŮ ODCHYLEK OBDÉLNÍKŮ BYL MINIMÁLNÍ, TJ. $A^2 + B^2 + C^2 + D^2 \to \min$.

(= MINIMALIZACE SOUČTU PLOCH □)

B12) $\int f \cdot g' \, dx = f \cdot g - \int f \cdot g' \, dx$

$\int x \cdot \sin x \, dx = \left| \begin{matrix} f = x & f' = 1 \\ g' = \sin x & g = -\cos x \end{matrix} \right|$

$= -x \cdot \cos x + \int \cos x \, dx =$

$= -x \cdot \cos x + \sin x + c$

LÍKAŘKA 2

I) $\begin{pmatrix} -7 \\ -10 \\ 9 \end{pmatrix}$, II) $-2x \cdot \sin x^2$, III) $\frac{3}{4}$, IV) $y = 5^x - 1$

1) C, 2) A, 3) B, 4) B, 5) B | 6) $x \in \{0, 3, -4\}$

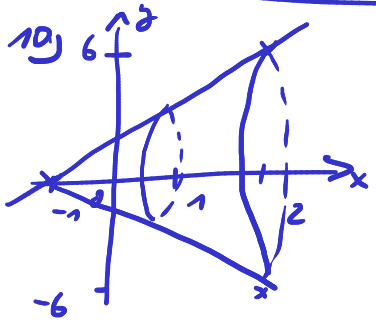
7) a) $D(f) = \mathbb{R} - \{0, 1\}$, b) v $+\infty$ i v $-\infty$ je $y = 0x + 0 = 0$

c) f': $\oplus$ | $\oplus$ | $\ominus$ | $\ominus$; f: ↗ 0 ↗ | $\frac{1}{2}$ ↘ | 1 ↘ — lok. max. v $x = \frac{1}{2}$

d) $f'' = \frac{18x^2 - 18x + 6}{(x^2 - x)^3}$, e) f'': $\oplus$ | $\ominus$ | $\oplus$; f: ∪ | 0 ∩ | 1 ∪ — není I.B. ($0, 1 \notin D(f)$)

8) (A) $\frac{4}{3} \cdot x^{\frac{1}{3}} + (14x^6 + 4) \cdot \cos(2x^7 + 4x)$, (B) $\frac{-2}{y^2}$

9) (A) $e^{-2} - e^{-18}$, (B) $(x - 5) \cdot \cos x - \sin x + c$

10) 

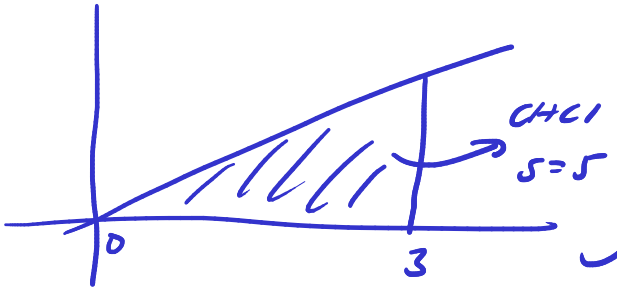
$V = \pi \cdot \int_{-1}^{2} (2x + 2)^2 \, dx = 36\pi$

11) $T(x) = -x^2 - x$, $T(0,1) = \frac{-11}{100}$

B12) F = PRIMITIVNÍ FCE K f, N.-L. FORM.: $\int_a^b f(x)\,dx = F(b) - F(a)$

PODGRAF = 5, INT. $[0, 3]$

ZNUSÍM PŘÍMKU PROCH. POČÁTKEM $y = kx$



$\int_0^3 k \cdot x \, dx = 5$

$\left[k \cdot \frac{x^2}{2}\right]_0^3 = 5$

$k \cdot \frac{9}{2} = 5$

$k = \frac{10}{9}$

⇒ JE TO $y = \frac{10}{9}x$

OVĚŘENÍ:

$\int_0^3 \frac{10}{9} x \, dx =$

$\frac{10}{9} \cdot \left[\frac{x^2}{2}\right]_0^3 =$

$= \frac{10}{9} \cdot \frac{9}{2} = 5$