$$f(x)=\frac{15x^2-13x-20}{8x^2+10x-7} \qquad 8\left(x-\frac{1}{2}\right)\left(x+\frac{7}{4}\right)$$

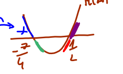
1) Dziedzina

$D: x\in\left(-\infty,-\frac{7}{4}\right)\cup\left(-\frac{7}{4},\frac{1}{2}\right)\cup\left(\frac{1}{2},+\infty\right)$

2) $\lim\limits_{x\to\pm\infty}\frac{15x^2-13x-20}{8x^2+10x-7}=\lim\limits_{x\to\pm}\frac{15-\frac{13}{x}-\frac{20}{x^2}}{8+\frac{10}{x}-\frac{7}{x^2}}=\frac{15}{8}$

$15\left(-\frac{7}{4}\right)^2+13\cdot\frac{7}{4}-20$

$\lim\limits_{x\to-\frac{7}{4}^-}\frac{15x^2-13x-20}{8x^2+10x-7}=\frac{a^+}{0^+}=\cancel{\pm}\infty=+\infty$ $\quad M(x)=8x^2+10x+7$



$\lim\limits_{x\to-\frac{7}{4}^+}f(x)=\frac{a^+}{0^-}=-\infty$

$15\cdot\left(\frac{1}{2}\right)^2-13\cdot\frac{1}{2}-20$

$\boxed{\lim\limits_{x\to\frac{1}{2}^\mp}}\frac{15x^2-13x-20}{8x^2+10x-7}=\frac{b^-}{0^\mp}=\pm\infty$

3) asymptoty.

$\lim\limits_{x\to-\frac{7}{4}^\mp}f(x)=\pm\infty \Rightarrow$ as. piom. $x=-\frac{7}{4}$

$\lim\limits_{x\to\frac{1}{2}^\mp}f(x)=\pm\infty \Rightarrow$ as. piom. $x=\frac{1}{2}$

$\lim\limits_{x\to\pm\infty}f(x)=\frac{15}{8} \Rightarrow$ as pozioma $y=\frac{15}{8}$

($\lim\limits_{x\to\pm\infty}g(x)=\pm\infty$. sprawdzamy ukośną) nie ma.

4) OX: OY: $f(0)=\frac{20}{7}$ $\left(0,\frac{20}{7}\right)$

5) PARZYSTOŚĆ z $D \Rightarrow$ NIE JEST

II POCHODNA I JEJ ANALIZA ZNAKU

$$f'(x)=\left(\frac{15x^2-13x-20}{8x^2+10x-7}\right)'=\frac{(15x^2-13x-20)'(8x^2+10x-7)-}{(8x^2+10x-7)^2}$$

$$\frac{-(15x^2-13x-20)(8x^2+10x-7)'}{}=\frac{(30x-13)(8x^2+10x-7)}{M}$$

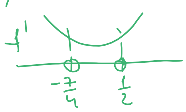
$$\frac{-(15x^2-13x-20)(16x+10)}{M}=$$

$\cancel{30\cdot 8x^3}+300x^2-210x-13\cdot 8x^2-\cancel{130x}+13\cdot 7-\cancel{15\cdot 16x^3}-150x^2+13\cdot 16x^2+$

$\cancel{130x}+20\cdot 16x+200 \;=(13\cdot 8+150)x^2+(320-210)x+291$

$$f'(x)=\frac{254x^2+110x+291^{\Delta<0}}{(8x^2+10x-7)^2} \qquad D_{f'}=D_f$$

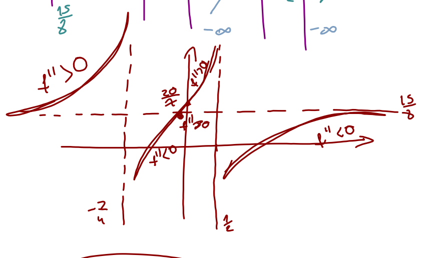
WK $f'(x)=0 \Leftrightarrow$ $x\in\emptyset$



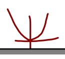
WW

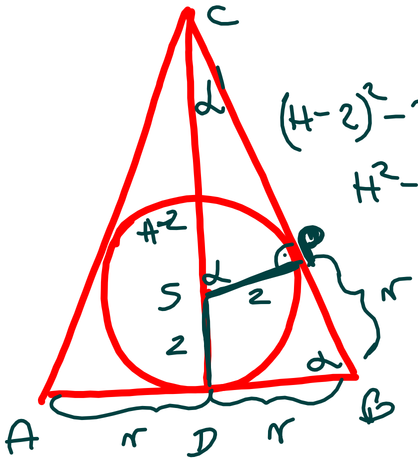
DZIEDZINA, Miejsca zerowe f'

x	$\left(-\infty,-\frac{7}{4}\right)$	$-\frac{7}{4}$	$\left(-\frac{7}{4},\frac{1}{2}\right)$	$\frac{1}{2}$	$\left(\frac{1}{2},+\infty\right)$
$f'(x)$	+	X	+	X	+
$f(x)$	$\frac{15}{8}\nearrow+\infty$	as PION $x=-\frac{7}{4}$	$-\infty\nearrow+\infty$	as PION $x=\frac{1}{2}$	$-\infty\nearrow\frac{15}{8}$



$f'(x_0)=0$ $\quad f(x)=x^2$





$$V = \frac{1}{3}\pi r^2 \cdot H$$

$(H-2)^2 - 2^2 = CP^2$

$H^2 - 4H = CP^2$

$\triangle DBC \sim \triangle PSC$

$$\boxed{\frac{r}{2} = \frac{H}{CP}} = \frac{CB}{H-2}$$

$$\frac{r^2}{4} = \frac{H^2}{H^2-4H}$$

$$\frac{r^2}{4} = \frac{H}{H-4}$$

$$r^2 = \frac{4H}{H-4}$$

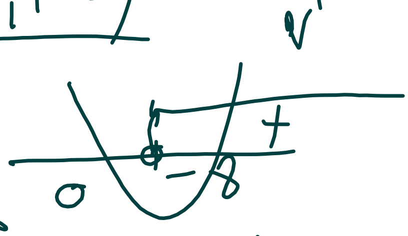
$$V = \frac{4\pi}{3} \cdot \frac{H^2}{H-4}$$

$+$

$$V'(H) = \frac{4\pi}{3} \cdot \frac{2H(H-4) - H^2}{(H-4)^2}$$

$$V'(H) = \frac{4\pi}{3} \cdot \frac{H^2 - 8H}{(H-4)^2} = \frac{4\pi}{3} \cdot \frac{H(H-8)}{(H-4)^2}$$

$V(H)$ D: $H \in (4, +\infty)$



dla $H=8$ V_{min}