REŠI

$$\left(4-\frac{y^2}{x^2}\right)dx + 2\left(\frac{y}{x}\right)dy = 0$$

$P = 4 - \frac{y^2}{x^2} \Rightarrow P_y = -\frac{2y}{x^2}$
$Q = 2\frac{y}{x} \Rightarrow Q_x = -\frac{2y}{x^2}$
} EKSAKTNA DIFERENCIALNA ENAČBA

$u_x \overset{*}{=} 4 - \frac{y^2}{x^2}$ $\quad u_x \overset{*}{=} 4 - \frac{y^2}{x^2} \Rightarrow u \overset{(1)}{=} 4x + \frac{y^2}{x} + \varphi(y)$

$u_y \overset{**}{=} 2\frac{y}{x}$ $\quad \Rightarrow u_y = \frac{2y}{x} + \varphi'(y)$ } $\rightarrow$
$u_y \overset{**}{=} \frac{2y}{x}$

$\Rightarrow \varphi'(y) = 0 \rightarrow \varphi(y) = C$

$\overset{(1)}{\Rightarrow} u = 4x + \frac{y^2}{x} + C$

$\Rightarrow$ REŠITEV D.E. JE OBLIKE $4x + \frac{y^2}{x} + C = D$

$4x + \frac{y^2}{x} = E$

$$\frac{4x^2+y^2}{x} = E$$

ENAČBO BI LAHKO ZAPISALI KOT $y' = \frac{\left(\frac{y}{x}\right)^2 - 4}{2\left(\frac{y}{x}\right)}$ (ENAČBA S HOMOGENO DESNO STRANJO)

UPELJEMO $u = \frac{y}{x} \Rightarrow y = ux \rightarrow y' = u'x + u$

$$u'x + u = \frac{u^2-4}{2u}$$

$$u'x = \frac{u^2-4}{2u} - u = \frac{u^2-4-2u^2}{2u} = \frac{-4-u^2}{2u}$$

$$\frac{2u\,du}{u^2+4} = -\frac{dx}{x}$$

$\ln|u^2+4| = -\ln|x| + \ln C \Rightarrow |u^2+4| = \frac{C}{|x|} \Rightarrow \left(\frac{y}{x}\right)^2 + 4 = \frac{D}{x}$ $\quad D \neq 0$
$C > 0$