Practice Problems. Eqn's of 1st order but not of first degree

Solve the following D.Eqn. ; $p = \frac{dy}{dx}$.

1. $p^2 + (x+y-2\frac{y}{x})p + xy + y^2/x^2 - y - \frac{y^2}{x} = 0.$

2. $p^2 - 7p + 12 = 0$

3. $p^2 - xy = y^2 - px.$

(4) $p^2 + 2py\cot x = y^2$

(5) $x^2p^2 - 2xyp + y^2 - x^2y^2 - x^4 = 0.$

(6) $y = 2px + p^2y$

(7) X $y^2\log y = xpy + p^2$

(8) $x = 4(p+p^3)$

(9) $x = a - p(1+p^2)^{-1/2}$

(10) $y = x\{p + (1+p^2)^{1/2}\}$

(11) $yp^2 - 2xp + y = 0.$

(12) $y = x + \tan^{-1}p.$

(13) $y = 3px + 4p^2$

(14) $y = p\sin p + \log\cos p.$

(15) $p^2(x^2-a^2) - 2pxy + y^2 - b^2 = 0$.

(16) Reduce the eqn $axyp^2 + (x^2 - ay^2 - b)p - xy = 0$ into clairaut's form & hence solve.

(17) Reduce the eqn $y = 2px + ayp^2$ by putting $y^2 = v$ to clairaut's form hence solve.

(18) Find the general and singular sol^{n}s of

$$3xy = 2px^2 - 2p^2$$

(19) Solve the D.E. $(8p^3 - 27)x = 12p^2y$ and investigate whether a singular sol^n exists?

(20) Find the general & singular sol^n of

$$y = x - 2ap + ap^2$$

(21) Find the general & singular sol^n of

$$y = px + (b^2 + a^2p^2)^{1/2}$$

(22) Find the general & singular sol^n of

$$y^2 - 2pxy + p^2(x^2 - 1) = k^2$$