

## Homogeneous and Special Transformations

2.8  $\frac{dy}{dx} + \frac{x}{y} + 2 = 0$     **ANS**  $\ln|x+y| + \frac{x}{x+y} = C; y = -x$

2.9  $x dy - y dx = x \cot\left(\frac{y}{x}\right) dx$     **ANS**  $\cos\left(\frac{y}{x}\right) = \frac{C}{x}$

2.10  $\left[x \cos^2\left(\frac{y}{x}\right) - y\right] dx + x dy = 0$     **ANS**  $\ln|x| + \tan\frac{y}{x} = C; \cos\frac{y}{x} = 0$

2.11  $x dy = y(1 + \ln y - \ln x) dx$     **ANS**  $y = x e^{Cx}$

2.12  $xy dx + (x^2 + y^2) dy = 0$     **ANS**  $y^2(2x^2 + y^2) = C$

2.13  $\left[1 + \exp\left(-\frac{y}{x}\right)\right] dy + \left(1 - \frac{y}{x}\right) dx = 0$     **ANS**  $x \exp\left(\frac{y}{x}\right) + y = C$

2.14  $(x^2 - xy + y^2) dx - xy dy = 0$     **ANS**  $(y-x)e^{y/x} = C$

2.15  $(3 + 2x + 4y)y' = 1 + x + 2y$

**ANS**  $8y - 4x + \ln|4x + 8y + 5| = C; 4x + 8y + 5 = 0$

2.16  $y' = \frac{2x + y - 1}{x - y - 2}$     **ANS**  $\sqrt{2} \tan^{-1} \frac{y+1}{\sqrt{2}(x-1)} = \ln[(y+1)^2 + 2(x-1)^2] + C$

2.17  $(y+2) dx = (2x + y - 4) dy$     **ANS**  $(y+2)^2 = C(x+y-1); y = 1 - x$

2.18  $y' = \sin^2(x-y)$     **ANS**  $x = \tan(x-y) + C; x - y = \frac{\pi}{2} \pm k\pi, k = 0, 1, 2, \dots$

2.19  $\frac{dy}{dx} = (x+1)^2 + (4y+1)^2 + 8xy + 1$     **ANS**  $\frac{2}{3}(x+4y+1) = \tan(6x+C)$