

① $\frac{dy}{dx} = \frac{8x^3}{3y^2}$
 $\int 3y^2 dy = \int 8x^3 dx$
 $\frac{3y^3}{3} + C_1 = \frac{8x^4}{4} + C_2$
 $y^3 = 2x^4 + C$
 $y = \sqrt[3]{2x^4 + C}$

② $\frac{dy}{dx} = xy^3$
 $\frac{1}{y^3} dy = x dx$
 $\int y^{-3} dy = \int x dx$
 $(\frac{y^{-2}}{-2} + C_1 = \frac{x^2}{2} + C_2)$
 $-\frac{1}{2} (\frac{y^{-2}}{-2} = \frac{x^2}{2} + C)$

$y^{-2} = -x^2 + C$
 $\frac{1}{y^2} = -x^2 + C$
 $y = y^2(-x^2 + C)$

$-\frac{1}{x^2 + C} = y^2$ $y = \pm \sqrt{\frac{1}{-x^2 + C}} = \pm \frac{1}{\sqrt{-x^2 + C}}$

③ $y' = \frac{x}{2y}$
 $\frac{dy}{dx} = x/2y$
 $\int 2y dy = \int x dx$
 $\frac{2y^2}{2} + C_1 = \frac{x^2}{2} + C_2$
 $y^2 = \frac{1}{2}x^2 + C$
 $y = \pm \sqrt{\frac{1}{2}x^2 + C}$

④ $y' = \frac{\sqrt{x}}{\sqrt{y}}$
 $\frac{dy}{dx} = \frac{\sqrt{x}}{\sqrt{y}}$
 $\int \sqrt{y} dy = \int \sqrt{x} dx$
 $\int y^{1/2} dy = \int x^{1/2} dx$
 $\frac{2}{3} y^{3/2} + C_1 = \frac{2}{3} x^{3/2} + C_2$
 $\frac{2}{3} (y^{3/2} - x^{3/2}) = C$
 $(y^{3/2}) - (x^{3/2}) = C^{3/4}$
 $y = \pm (x^{3/2} + C)^{2/3}$
 $y = \pm \sqrt[3]{(x^{3/2} + C)^2}$

⑤ $y' = x^3 y^2$
 $\frac{dy}{dx} = x^3 y^2$
 $\int \frac{1}{y^2} dy = \int x^3 dx$
 $\int y^{-2} dy = \int x^3 dx$
 $\frac{y^{-1}}{-1} + C_1 = \frac{x^4}{4} + C_2$
 $-\frac{1}{y} = \frac{1}{4}x^4 + C$
 $-1 = y(\frac{1}{4}x^4 + C)$
 $y = \frac{-1}{\frac{1}{4}x^4 + C}$

⑥ $\frac{dy}{dx} = \frac{4x}{y}$ (3,0)
 $\int y dy = \int 4x dx$
 $\frac{y^2}{2} = 4x^2 + C$
 $0^2 = 2(3)^2 + C$
 $0 = 18 + C$
 $-18 = C$
 $\frac{y^2}{2} = 4x^2 - 18$
 $y^2 = 4x^2 - 36$
 $y = \pm \sqrt{4x^2 - 36}$

⑦ $\frac{dy}{dx} = 2xy^2$, (3,-1)
 $\int y^{-2} dy = \int 2x dx$
 $-y^{-1} = 2x^2/2 + C$
 $-\frac{1}{y} = x^2 + C$
 $1 = 9 + C$
 $-8 = C$
 $-\frac{1}{y} = x^2 - 8$
 $-1 = y(x^2 - 8)$
 $-\frac{1}{x^2 - 8} = y$

or
 $-\frac{1}{-x^2 + 8} = y$

⑧ $\frac{dy}{dx} = 9x^2 y$, (-1,4)
 $\int 2y dy = \int 9x^2 dx$
 $2y^2/2 = 9x^3/3 + C$
 $y^2 = 3x^3 + C$
 $4^2 = 3(-1)^3 + C$
 $16 = -3 + C$
 $19 = C$
 $y^2 = 3x^3 + 19$
 $y = \pm \sqrt{3x^3 + 19}$

$$(9) \frac{dy}{dx} = \frac{\sqrt{x}}{\sqrt{y}}, (1,1)$$

$$\sqrt{y} dy = \sqrt{x} dx$$

$$\int y^{1/2} dy = \int x^{1/2} dx$$

$$\frac{2y^{3/2}}{3} = \frac{2x^{3/2}}{3} + C$$

$$\frac{2}{3} = \frac{2}{3} + C$$

$$C=0$$

$$\frac{2}{3} y^{3/2} = \frac{2}{3} x^{3/2}$$

$$y^{3/2} = x^{3/2}$$

$$y = x$$

$$(10) \frac{dy}{dx} = 10x^4 y^2, (-1,1)$$

$$\int \frac{1}{y^2} dy = \int 10x^4 dx$$

$$\int y^{-2} dy = \int 10x^4 dx$$

$$-y^{-1} = \frac{10x^5}{5} + C$$

$$-\frac{1}{y} = 2x^5 + C$$

$$-1 = 2(-1)^5 + C$$

$$-1 = -2 + C$$

$$1 = C$$

$$-\frac{1}{y} = 2x^5 + 1$$

$$-1 = y(2x^5 + 1)$$

$$\frac{-1}{(2x^5 + 1)} = y$$

$$\text{OR}$$
$$y = \frac{1}{-2x^5 - 1}$$