s 1

for the Constant of Integration

ate and solve for the constant of integration
ne following point that the original function
through.

$(x^2+2x)dx$ *through* $(-1,2)$

$= 3x^2+1$ *through* $(1,4)$

$y = xdx$ *if* $f(2)=3$

$= 4x^3y^2$ *through* $(1,3)$

$r) = x$ *where* $f'(0)=4$ *and* $f(0)=6$

1) $dy = (x^2 + 2x)dx$ *through* $(-1,2)$

$$\int dy = \int (x^2 + 2x)\,dx$$

$$y = \frac{1}{3}x^3 + x^2 + C$$

$$2 = \frac{1}{3}(-1)^3 + (-1)^2 + C$$

$$2 = -\frac{1}{3} + 1 + C$$

$$2 = \frac{2}{3} + C \qquad C = \frac{4}{3}$$

$$y = \frac{1}{3}x^3 + x^2 + 4/3$$

2) $\frac{dy}{dx} = 3x^2 + 1$ *through* $(1,4)$

$$\int dy = \int (3x^2 + 1)\,dx$$

$$y = x^3 + x + C$$

$$4 = 1^3 + 1 + C$$

$$4 = 2 + C$$

$$2 = C$$

$$\boxed{y = x^3 + x + 2}$$

3) $2ydy = xdx \quad if \quad f(2) = 3$

$\int 2y\,dy = \int x\,dx$

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

$3^2 = \frac{1}{2}(2)^2 + C$

$9 = 2 + C$

$7 = C$

$y^2 = \frac{1}{2}x^2 + 7$

4) $\frac{dy}{dx} = 4x^3y^2$ through $(1,3)$

$$\frac{1}{y^2}\,dy = 4x^3\,dx$$

$$\int y^{-2}\,dy = \int 4x^3\,dx$$

$$-y^{-1} = x^4 + C$$

$$-\frac{1}{3} = 1^4 + C$$

$$-\frac{1}{3} = 1 + C$$

$$C = -4/3$$

$$-y^{-1} = x^4 - 4/3$$

dx

) $f''(x) = x$ *where* $f'(0) = 4$ *and* $f(0) = 6$

$$\int f''(x) = \int x \, dx$$

$$f'(x) = \frac{1}{2}x^2 + C$$

$$4 = \frac{1}{2}(0)^2 + C$$

$$4 = C$$

$$f'(x) = \frac{1}{2}x^2 + 4$$

$$\int f'(x) = \int \frac{1}{2}x^2 + 4$$

$$f(x) = \frac{1}{6}x^3 + 4x + C$$

$$f(0) = \frac{1}{6}(0)^3 + 4(0) + C$$

$$6 = C$$

$$f(x) = \frac{1}{6}x^3 + 4x + 6$$