

$$\textcircled{1} \int \frac{3\sqrt{-4x^{1/2}}}{\sqrt{x}} dx$$

$$\textcircled{2} f''(x) = 3x^2 \quad f'(0) = 1 \quad f(0) = 3$$

$$\boxed{y = f(x)}?$$

$$\textcircled{3} \int_0^3 |x^2 - 4| dx$$

$$\textcircled{4} \int_0^\pi \sin x \cos x dx$$

$$\textcircled{1} \int 3x^{-1/2} - 4 dx \rightarrow 3(2x^{1/2}) - 4x \rightarrow \boxed{2\sqrt{x}(3 - 2\sqrt{x}) + c}$$

$$\textcircled{2} f'(x) = \frac{3x^3}{3} = x^3 + c \quad 1 = (0)^3 + c \quad f'(x) = x^3 + 1$$

$$\boxed{c = 1}$$

$$f(x) = \int (x^3 + 1) dx \quad f(x) = \frac{x^4}{4} + x + c$$

$$3 = \frac{(0)^4}{4} + (0) + c$$

$$\boxed{c = 3} \quad \boxed{y = \frac{x^4}{4} + x + 3}$$

$$\textcircled{3} x^2 - 4 = 0$$

$$x = \pm 2$$

$$\int_0^2 (x^2 - 4) dx + \int_2^3 (x^2 - 4) dx$$

$$\left[\frac{x^3}{3} - 4x \right]_0^2 + \left[\frac{x^3}{3} - 4x \right]_2^3 \quad \frac{8}{3} - \frac{24}{3} = -\frac{16}{3}$$

$$\left| -\frac{16}{3} \right| + \left(-\frac{9}{3} - -\frac{16}{3} \right) \quad -\frac{9}{3} - -\frac{16}{3} = \left(\frac{7}{3} \right)$$

$$\frac{27}{3} - \frac{36}{3} = -\frac{9}{3} = -3$$

$$\frac{16}{3} + \frac{7}{3} = \left(\frac{23}{3} \right)$$

$$\textcircled{4} u = \sin x$$

$$du = \cos x dx$$

$$u = \sin \pi = 0$$

$$u = \sin 0 = 0$$

$$\int_0^\pi u du \rightarrow \left[\frac{u^2}{2} \right]_0^0 = \boxed{0}$$