

$$19. \int \frac{x}{(1-x^2)^3} dx$$

$$\int x(1-x^2)^{-3} dx$$

$$u = 1-x^2$$

$$du = -2x dx$$

$$-\frac{1}{2} \int u^{-3} du$$

$$17. \int 5x(1-x^2)^{1/3} dx$$

$$\frac{5}{-2} \int u^{1/3} du$$

$$u = 1 - x^2$$
$$du = -2x dx$$

## 4.5 B Definite Integrals

$$A. \int_0^1 (x^2-9)^3 \underline{(2x) dx}$$

$$u = x^2 - 9$$

$$du = \underline{2x dx}$$

$$\int u^3 du$$

$$\frac{u^4}{4}$$

$$\frac{(x^2-9)^4}{4} \Big|_0^1$$

$$\frac{4096}{4} - \frac{6561}{4}$$

$$= -\frac{2465}{4}$$

$$\int (x^2 - 9)^3 (2x) dx$$

$$u = x^2 - 9$$
$$du = 2x dx$$

$$\int_{-9}^{-8} u^3 du$$

$$\frac{u^4}{4} \Big|_{-9}^{-8}$$

$$\frac{(-8)^4}{4} - \frac{(-9)^4}{4}$$

$$\text{Ex. } \int_0^4 (3x+4)^{1/2} dx$$

$$u = 3x+4$$

$$du = 3 dx$$

$$\frac{4^{3/2}}{\sqrt{4^3}}$$

$$\frac{1}{3} \int_4^{16} u^{1/2} du$$

$$\frac{1}{3} \left[ \frac{2}{3} u^{3/2} \right]_4^{16}$$

$$\frac{2}{9} \left[ 16^{3/2} - 4^{3/2} \right]$$

$$\frac{2}{9} [64 - 8]$$

$$\frac{112}{9}$$

$$B. \int x \sqrt{x-1} \, dx$$

$$= \int x (x-1)^{1/2} \, dx$$

$$\left. \begin{array}{l} u = x - 1 \\ \frac{du}{dx} = 1 \\ u + 1 = x \end{array} \right)$$

$$\int u^{1/2} (u+1) \, du$$
$$\int u^{3/2} + u^{1/2} \, du$$

$$\frac{2}{5} u^{5/2} + \frac{2}{3} u^{3/2} + C$$

$$\frac{2}{5} (x-1)^{5/2} + \frac{2}{3} (x-1)^{3/2} + C$$

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63, 64, 66

71-78

87, 88