

Student Name: \_\_\_\_\_

Score: \_\_\_\_\_

**Integration using Substitution**

Sheet 1

Integrate the following w.r.t. x

$$\int \frac{8x + 5}{\sqrt[3]{4x^2 + 5x + 1}} dx$$

$$\int \frac{24x^2 - 2x + 1}{(8x^3 - x^2 + x)^{\frac{7}{2}}} dx$$

$$\int (4x+6)\sqrt{x^2 + 3x - 4} dx$$

$$\int \frac{3x^2 + 10x}{(\sqrt{x^3 + 5x^2 - 2})^5} dx$$

$$\int \frac{6x^2 + 14x + 3}{(2x^3 + 7x^2 + 3x)^{\frac{5}{3}}} dx$$

$$\int \frac{8x - 24}{\sqrt[3]{x^2 - 6x + 5}} dx$$

$$\int \frac{6x - 8}{\sqrt[3]{3x^2 - 8x - 3}} dx$$

$$\int \frac{21x^2 + 2x}{(7x^3 + x^2 + 5)^{\frac{6}{7}}} dx$$

$$\int \frac{4x + 16}{\sqrt{2x^2 + 16x - 5}} dx$$

$$\int (x^2 + 3x + 1)^{\frac{11}{2}} (2x + 3) dx$$

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Answer key

Integration using Substitution

Sheet 1

$$\frac{3(4x^2+5x+1)^{\frac{2}{3}}}{2} + C$$

$$-\frac{2}{5(8x^3-x^2+x)^{\frac{5}{2}}} + C$$

$$\frac{4(x^2+3x-4)^{\frac{3}{2}}}{3} + C$$

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

$$-\frac{3}{2(2x^3+7x^2+3x)^{\frac{2}{3}}} + C$$

$$6(x^2-6x+5)^{\frac{2}{3}} + C$$

$$\frac{3(3x^2-8x-3)^{\frac{2}{3}}}{2} + C$$

$$7(7x^3+x^2+5)^{\frac{1}{7}} + C$$

$$-\frac{2}{\sqrt{2x^2+16x-5}} + C$$

$$\frac{2(x^2+3x+1)^{\frac{13}{2}}}{13} + C$$