

Homework u -substitution

Evaluate the following integrals.

$$1. \int (3x^2 + 1)^2 \cdot 6x \, dx$$

$$2. \int (3x^2 + 1)^5 \cdot 6x \, dx$$

$$3. \int (3x + 1)^5 \, dx$$

$$4. \int (\sin x)^2 \cos x \, dx$$

$$5. \int \frac{x}{\sqrt{x^2 + 1}} \, dx$$

$$6. \int (3x^2 + 3)\sqrt{x^3 + 3x} \, dx$$

$$7. \int x^2 \cos(x^3) \, dx$$

$$8. \int 3x \sqrt[3]{1 - x^2} \, dx$$

$$9. \int \sec^2 x \tan^2 x \, dx$$

$$10. \int \sec^2 x \, dx$$

$$11. \int \frac{x^3 - 3x^2 + 1}{\sqrt{x}} \, dx$$

$$12. \int \frac{x^2}{(1 - x^3)^4} \, dx$$

$$13. \int (x^2 + 2x + 2)(x^3 + 3x^2 + 6x) \, dx$$

$$14. \int \frac{1}{\sqrt{3x}} \, dx$$

$$15. \int x \sqrt{x - 1} \, dx$$

The answers.

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

$$2. \frac{(3x^2 + 1)^6}{6} + C$$

$$3. \frac{(3x + 1)^6}{18} + C$$

$$4. \frac{\sin^3 x}{3} + C$$

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

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

$$7. \frac{1}{3}\sin(x^3) + C$$

$$8. -\frac{9}{8}(1 - x^2)^{\frac{4}{3}}$$

$$9. \frac{\tan^3 x}{3} + C$$

$$10. \tan x + C$$

$$11. \frac{2}{7}x^{\frac{7}{2}} - \frac{6}{5}x^{\frac{5}{2}} + 2x^{\frac{1}{2}} + C$$

$$12. \frac{1}{9}(1 - x^3)^{-3} + C$$

$$13. \frac{1}{6}(x^3 + 3x^2 + 6x)^2 + C$$

$$14. \frac{2}{\sqrt{3}}x^{\frac{1}{2}} + C$$

$$15. \frac{2}{5}(x - 1)^{\frac{5}{2}} + \frac{2}{3}(x - 1)^{\frac{3}{2}} + C$$