

Integration with Substitution Problems Competition

One Point Questions:

1. $\int (4x - 3)^9 dx$

2. $\int \cos x \sqrt{\sin x} dx$

3. $\int 4(6x - 1)^4 dx$

4. $\int \sin\left(\frac{x}{3}\right) dx$

5. $\int \frac{x^3}{(5x^4 + 2)^3} dx$

6. $\int 2xe^{3x^2} dx$

Two Point Questions:

7. $\int \cos^5(3x) \sin(3x) dx$

8. $\int \frac{xdx}{\sqrt{2x^2 + 5}}$

9. $\int \tan^6(x) \sec^2(x) dx$

10. $\int \sec^6(x) \tan(x) dx$

11. $\int (2x^3 - 1)(x^4 - 2x)^5 dx$

Answers:

1. $\frac{(4x - 3)^{10}}{40} + C$

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

3. $\frac{2(6x - 1)^5}{15} + C$

4. $-3 \cos\left(\frac{x}{3}\right) + C$

5. $\frac{-1}{40(5x^4 + 2)^2} + C$

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

7. $\frac{-\cos^6(3x)}{18} + C$

8. $\frac{\sqrt{2x^2 + 5}}{2} + C$

9. $\frac{\tan^7 x}{7} + C$

10. $\frac{\sec^6 x}{6} + C$

11. $\frac{(x^4 - 2x)^6}{12} + C$

$$12. \int \frac{2x dx}{4x^2 - 3}$$

$$13. \int \frac{dx}{\sqrt{1 - 9x^2}}$$

$$14. \int \frac{\sqrt{\ln x}}{x} dx$$

Three Point Questions:

$$15. \int (x^2 + 2)^2 dx$$

$$16. \int \frac{dx}{\sqrt{9 - x^2}}$$

$$17. \int 2 \cot(x) dx$$

$$18. \int \frac{dx}{e^x}$$

$$12. \frac{\ln|4x^2 - 3|}{4} + C$$

$$13. \frac{\sin^{-1}(3x)}{3} + C$$

$$14. \frac{2(\ln x)^{\frac{3}{2}}}{3} + C$$

$$15. \frac{x^5}{5} + \frac{4x^3}{3} + 4x + C$$

$$16. \sin^{-1}\left(\frac{x}{3}\right) + C$$

$$17. 2 \ln|\sin x| + C$$

$$18. -e^{-x} + C$$