

Problems for Gateway #2: U-Substitution

1. Calculate the antiderivative of: $f(x) = 3x^2 \cdot (1 + x^3)^4$.
2. Calculate the antiderivative of: $f(x) = 2x \cdot \sqrt{10 + x^2}$.
3. Calculate the antiderivative of: $f(x) = \frac{4x}{1 + x^2}$.
4. Calculate the antiderivative of: $f(x) = \frac{2}{\sqrt{x}} \cdot (1 + \sqrt{x})^3$.
5. Calculate the antiderivative of: $f(x) = \frac{2x}{1 + x^2}$.
6. Calculate the antiderivative of: $f(x) = 2x \cdot e^{x^2}$.
7. Calculate the antiderivative of: $f(x) = \frac{\frac{1}{x}}{\ln(x)}$.
8. Calculate the antiderivative of: $f(x) = \frac{3x^2}{1 + x^3}$.
9. Calculate the antiderivative of: $f(x) = 2x \cdot (7 + x^2)^{19}$.
10. Calculate the antiderivative of: $f(x) = \frac{x}{\sqrt{1 + x^2}}$.

Answers

1. $F(x) = \frac{1}{5}(1 + x^3)^5 + C$
2. $F(x) = \frac{2}{3}(10 + x^2)^{\frac{3}{2}} + C$
3. $F(x) = 2 \cdot \ln(1 + x^2) + C$
4. $F(x) = (1 + \sqrt{x})^4 + C$
5. $F(x) = \ln(1 + x^2) + C$
6. $F(x) = e^{x^2} + C$
7. $F(x) = \ln(\ln(x)) + C$
8. $F(x) = \ln(1 + x^3) + C$
9. $F(x) = \frac{1}{20}(7 + x^2)^{20} + C$
10. $F(x) = \sqrt{1 + x^2} + C$