Integrals Substitution Technique Problems

Here are 10 integral problems that can be solved using the substitution technique:

1. $\int \sin(2x)\,dx$
   - Substitution: $u = 2x$
2. $\int e^{3x}\,dx$
   - Substitution: $u = 3x$
3. $\int \frac{1}{1+x^2}\,dx$
   - Substitution: $u = x^2$
4. $\int \frac{1}{\sqrt{1-x^2}}\,dx$
   - Substitution: $u = \sin^{-1}(x)$
5. $\int \frac{e^x}{1+e^x}\,dx$
   - Substitution: $u = 1 + e^x$
6. $\int \cos^2(x)\,dx$
   - Substitution: $u = \cos(x)$, use trigonometric identities
7. $\int \frac{x}{\sqrt{1+x^2}}\,dx$
   - Substitution: $u = 1 + x^2$
8. $\int xe^{x^2}\,dx$
   - Substitution: $u = x^2$
9. $\int \frac{dx}{x\ln(x)}$
   - Substitution: $u = \ln(x)$
10. $\int \sin(x)e^{\cos(x)}\,dx$
    - Substitution: $u = \cos(x)$

These problems represent common scenarios where substitution simplifies the integrals by transforming the variable of integration to a more manageable form.