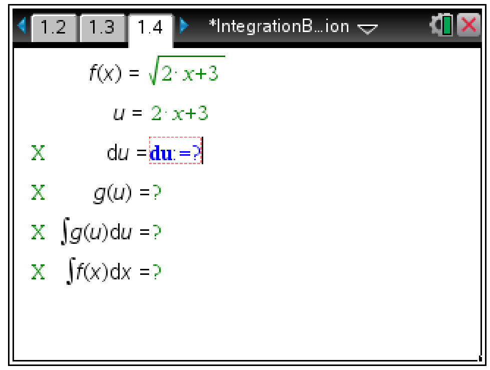
Integration By Substitution

IntegrationBySubstitution.tns

Name ______________________________

Class ______________________________

Part 1 – Introduction



1. Consider the integral $\int \sqrt{2x+3}\,dx$. Let ***u* = 2*x* + 3**. Evaluate the integral using substitution.

Check your process using the *Notes* page on 1.4. If you are correct, the X at the beginning of the line will change to a check mark. Note, delete the question mark "?", but not the colon equals ":=". Press [enter] to evaluate the Math Box.

2. Now try $\int \sin(x)\cos(x)dx$ by letting ***u* = sin(*x*)**.

3. With the same integral, use ***u* = cos(*x*)**. How does this result compare to the previous result?

4. sin(*x*)cos(*x*) can be rewritten as $\frac{1}{2}\sin(2x)$ using the Double Angle formula.

What is the result when you integrate $\int \frac{1}{2}\sin(2x)\,dx$ using substitution?

Part 2 – Common Feature

Find the result of the following integrals using substitution. Check your work using the *Notes* pages in the .tns document.

5. $\int \frac{x+1}{x^2+2x+3}dx$ **6.** $\int \sin(x)\,e^{\cos(x)}dx$ **7.** $\int \frac{x}{4x^2+1}dx$

8. What do these integrals have in common that makes them suitable for the substitution method?

Extension

Use trigonometric identities to rearrange the following integrals and then use the substitution method to integrate.

9. $\int \tan(x)dx$ **10.** $\int \cos^3(x)$