# APEX Section 6.1 Changes

*Note: throughout, a positive line number refers to a line that far from the top of the page, a negative line number refers to a line that far from the bottom of the page.*

## Text

1. This entire section should replace the current section 5.5, which moves to Calc II. I assume section numbers and references will change automatically?
2. In lines 2-3 of the intro, replace *The next chapter explores* with *Chapter 8 explores*
3. Insert the following marginal note near the bottom of page 255: *Recall from section 4.4 that the differentil of $x$, denoted $dx$, is any nonzero real number. If $u$ is a function of $x$, then the differential of $u$, denoted $du$, is defined by $du = u'(x)\,dx$.*
4. On lines 10-11 of page 257, change *that one can memorize; rather, experience will be one's guide* to *to memorize; rather, experience will be your guide*
5. Key Idea 10 on page 258 is not really a key idea. Remove the box and title and add the text to the previous paragraph.
6. In the Solution to Example 144:
   - The solution should start with *View this as a composition* - "as" is missing.
   - In the first line of the multiline equation, replace $\int \frac{7}{u}\frac{du}{-3}$ with $\int \left(\frac{7}{u}\right)\left(\frac{du}{-3}\right)$
7. Remove Examples 150 & 151 from here, they belong in a later chapter.
8. In Example 152 on the last line of page 265, replace *Since $u = x^{\frac{1}{2}}$, $u^2 = x$, etc.* with *Since $u = x^{\frac{1}{2}}$, we have $u^2 = x$ and $u^4 = x^2$.*
9. The entire subsection about inverse trig functions should be moved to Calc II: pages 266-269.
10. In the subsection itled **Substitution and Definite Integration**, replace the first paragraph on pages 269-270 (through the *workflow* sentence) with the following: *So far this section has focused on learning a new technique for finding antiderivatives. In practice, we will frequently be interested in finding definite integrals. We can use this antiderivative to evaluate the definite integral, but there is a more efficient method.*
11. Remove the approximation from the last line of the solution of Example 157.

12. Add the following example after Example 158:

    ***Example 159*** ***Definite integrals and substitution: changing the bounds***

    *Evaluate* $\int_0^2 xe^{x^2+1}\,dx$ *using Theorem 47.*

    ***Solution*** *We note the composition of functions and let* $u = x^2+1$*, hence* $du = 2x\,dx$*. We divide the differential by 2 to get* $\frac{du}{2} = x\,dx$*.*

    *Setting* $g(x) = u = x^2+1$*, we find that the new lower bound is* $g(0) = 1$*; the new upper bound is* $g(2) = 5$*. We now evaluate:*

$$\begin{aligned} \int_0^2 xe^{x^2+1}\,dx &= \int_1^5 e^u \frac{du}{2} \\ &= \frac{1}{2}e^u\Big|_1^5 \\ &= \frac{1}{2}(e^5 - e^0) \approx 147.41316 \end{aligned}$$

13. On line -4 of page 271, replace *The nect section* with *Chapter 8*

# Problems

1. Remove current problems 21, 23, 29, 30, 35-50, 61-73, 81-83

2. Remove current instructions before problems 3, 15, 24, 31, 35, 41, 51

3. Add the following instructions before problem 3: **Evaluate the following indefinite integrals.**

4. Mix the order of the remaining indefinite integrals.

5. Add the following indefinite integral:

    - $\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx$ ANS: $2\sin\sqrt{x} + C$
    - $\int \sec^2\theta\tan\theta\,d\theta$ ANS: $\frac{1}{2}\sec^2\theta + C$

6. Add the following definite integrals:

    - $\int_0^{\pi/4} e^{\tan x}\sec^2 x\,dx$ ANS: $e-1$
    - $\int_{-1}^1 \frac{x}{1+x^2}\,dx$ ANS: 0
    - $\int_1^{\ln 3} \frac{e^x}{1+e^x}\,dx$ ANS: $\ln\left(\frac{4}{1+e}\right)$
    - $\int_0^1 \frac{2x^2+1}{(2x^3+3x+2)^3}\,dx$ ANS: $\frac{15}{392}$
    - $\int_{-1}^2 \frac{x}{\sqrt{x+2}}\,dx$ ANS: $\frac{2}{3}$
    - $\int_0^{\frac{\pi}{4}} \cos^5(2x)\sin(2x)\,dx$ ANS: $\frac{1}{12}$