

MATE 3032 assignment 3: sections 7.2, 7.3

Keep in mind that when performing trigonometric substitution, it is not enough to indicate how the old variable depends on the new, but also how the new variable is constrained (e.g., $x = \sin \theta$, $-\pi/2 \leq \theta \leq \pi/2$). I recommend specifying the interval by using a figure showing a subset of the unit circle, as I did in class.

19. Evaluate the integral:

(a) $\int_0^{\pi/2} \sin^2 x \cos^2 x \, dx$

(b) $\int_0^{\pi/3} \sec x \tan^2 x \, dx$

(c) $\int \sin(4x) \cos(3x) \, dx$

(d) $\int_{\pi/4}^{3\pi/4} \csc x \cot^5 x \, dx$.

20. Evaluate the integral:

(a) $\int_0^{\pi/4} \theta \tan^2 \theta \, d\theta$

(b) $\int_0^{\pi} \sin^4(2\theta) \, d\theta$

(c) $\int_{-\pi/4}^{\pi/4} \tan^2 \theta \, d\theta$.

21. Exercise 69 p.485.

22. Evaluate the integral:

(a) $\int \frac{\sqrt{1+t^2}}{t} \, dt$. (Trigonometric substitution is not necessary).

(b) $\int_0^a \frac{dt}{(a^2 + t^2)^{3/2}}$.

23. Evaluate the integral:

(a) $\int_0^1 \sqrt{x^2 + 1} \, dx$

(b) $\int_1^2 \sqrt{x^2 - x} \, dx$. Hint: complete the square, and use the formula for $\int \sec^3 x \, dx$.

24-25. Exercises 35, 43 p. 492.

