Section 7.4: Trig Substitution

Group work:

Problem 1 *For the integral:*

$$\int \frac{27x^2}{(4+9x^2)^{3/2}}\,\mathrm{d}x$$

find an appropriate constant C and an appropriate trigonometric substitution of one of the forms $x = C\sin\theta$, $x = C\sec\theta$, or $x = C\tan\theta$ to simplify the integral. Then, perform any trigonometric manipulations necessary and evaluate the integral.

Problem 2 *Evaluate the following integrals:*

(a) $\displaystyle\int_{-\frac{5}{3}}^{-\frac{5}{6}} \frac{\sqrt{36x^2-25}}{x^3}\,dx$

(b) $\displaystyle\int \frac{dx}{\left(x^2-6x+11\right)^2}$

Problem 3 *Evaluate the following integrals:*

(a) $\displaystyle\int \frac{x^2}{\sqrt{4x-x^2}}\,dx$

(b) $\displaystyle\int \frac{e^x}{\sqrt{e^{2x}+9}}\,dx$

(c) $\displaystyle\int \frac{dx}{x^{\frac{1}{2}}-9x^{\frac{3}{2}}}$

Learning outcomes: