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What is on today

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1 Trigonometric substitution

Briggs-Cochran-Gillett-Schulz §8.4 pp. 538 - 543
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For integrals with an $a^2 + x^2$ term, we make the trigonometric substitution $x = a \tan \theta$; note that this gives $\theta = \tan^{-1}(x/a)$ for $-\pi/2 < \theta < \pi/2$.

Example 1 (§8.4 Ex. 18, 28). *Evaluate the following integrals:*

1. $\int \frac{dx}{(1+x^2)^{3/2}}$

2. $\int_0^6 \frac{z^2}{(z^2+36)^2} dz$

2 Integration strategies

Briggs-Cochran-Gillett-Schulz §8.6 pp. 556 - 562

In the last few sections, we've introduced various methods for evaluating integrals. Here we practice using all of the techniques we've learned so far.

Example 2 (§8.6 Ex. 12, 19, 24, 60, 67). *Evaluate the following integrals:*

1. $\int \frac{e^x}{\sqrt{1-e^{2x}}} dx$

2. $\int_0^{\pi/2} \sin^7 x dx$

3. $\int \frac{3w^5+2w^4-12w^3-12w-32}{w^3-4w} dw$

$$4. \int_0^{\pi/2} e^{-3x} \cos x dx$$

$$5. \int \frac{x^2}{\sqrt{1-9x^2}} dx$$