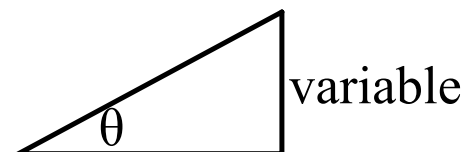


8.4 Trigonometric Substitution (A non-AP topic)

1. Use Pythagorean theorem to label sides of rt. triangle.
2. Put variable on the vertical, if possible.
3. Angle θ (theta) is opposite the vertical side.
4. Substitutions come from trig functions of θ (theta).

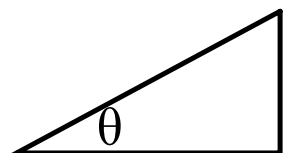
Special integration formulas



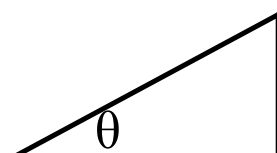
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Draw triangles and find a substitution for x for each case below:

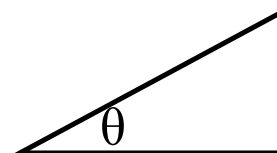
$$\sqrt{16 - x^2}$$



$$\sqrt{16 + x^2}$$



$$\sqrt{x^2 - 16}$$



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

$$\text{ex. } \int \frac{dx}{9x^2 + 1}$$

$$\text{ex. } \int \frac{x^2 dx}{\sqrt{x^2 - 3}}$$

$$\text{ex. } \int \frac{\sqrt{x^2 - 3}}{x} dx$$