Example: Use integration to find the area of the triangle with vertices (-1,1), (4,5) and (3,2).

\[ g-1 = 4(x+1) \]
\[ g-5 = -\frac{3}{2}(x-0) \]

Type 1 slice: \( \int_{-1}^{3} \frac{1}{2} \, dx \)

Area of Type 1 slice: \( |L| \, dx \)

Add slices from \( x=0 \) to \( x=3 \)

\[ \int_{-1}^{3} \frac{1}{2} \, dx = \int_{-1}^{3} \left( \frac{15}{4} - \frac{3}{2}x \right) \, dx \]

Type 2 slice: \( \int_{-1}^{3} L \, dx \)

Add slices from \( x=0 \) to \( x=3 \)

\[ = \left( \frac{15}{4} x^2 + \frac{15}{4} x \right) \bigg|_{x=0}^{x=3} \]

Example: Find the curved surface area of a cone of radius \( r \) and height \( h \) (a right circular cone).

Cut the cone open and lay it out to get

\[ \text{The region } C \text{ is a portion of a circle of radius } s, \text{ where } s \text{ is the slant height of the cone. The area of } C \text{ is } \frac{1}{2} B s. \]

The arc length along the border of \( C \) is \( B s \).

This arc length is also the length around the circle at the base of the cone, which is \( 2\pi r \).

So \( B s = 2\pi r \).
curved surface area = \frac{1}{2} \theta s^2

= \frac{1}{2} (8\pi) s

= \frac{1}{2} (2\pi r) s

= \pi rs

= \pi r \sqrt{a^2 + r^2}.