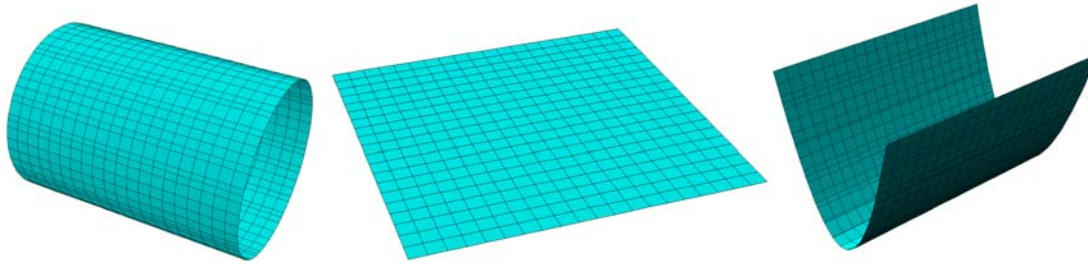


Are Cylinders Round?

by Kevin P. Rice, 2004 December 9
<http://freightyard.net/papers>

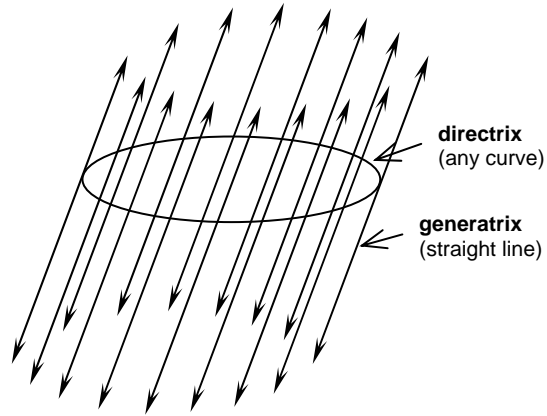
Which of the following surfaces are cylinders? **ALL OF THEM!**



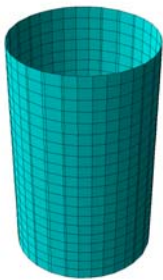
The figure on the left, traditionally considered a cylinder, is more properly, a **circular cylinder**. Therefore, what exactly is a cylinder?

Definition of a Cylinder:

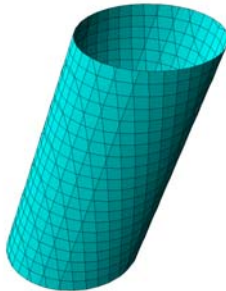
A cylinder is the **surface** traced by a straight line moving parallel to itself (called the **generatrix**) and intersecting a fixed curve (called the **directrix**). A cylinder so formed extends to infinity in both directions; however, by cutting the cylinder with two parallel planes (forming a “top” and “bottom”) the resulting space is also considered a cylinder.



When the generatrix is perpendicular to the directrix, a **right cylinder** (or straight cylinder) is traced; otherwise, the cylinder is **oblique**.



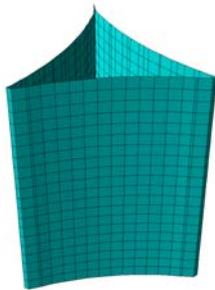
Right Circular Cylinder



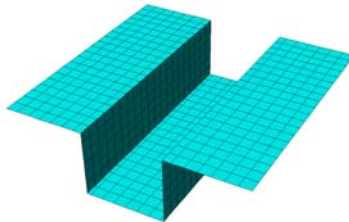
Oblique Circular Cylinder

Cylinders can be traced from any **continuous curve** or **curve segment**. The plane depicted at the top of this page is a cylinder whose directrix is simply a straight line. To the right of the plane is a parabolic cylinder (traced from a parabola).

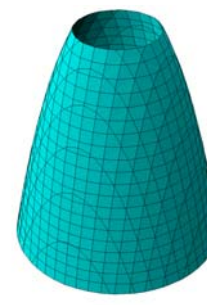
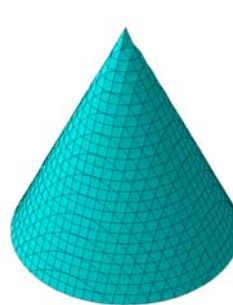
A curve can generally be regarded as derivable from a straight line by a reversible transformation (i.e., $y = f(x)$ and $x = f^{-1}(y)$.)



Tricuspid Cylinder
 $(x^2 + y^2 + 12x + 9)^2 = 4(2x + 3)^3$



A cylinder!
 $x^2 - z^{171} = 1$



These **ARE NOT** cylinders!

References:

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<http://facstaff.bloomu.edu/skokoska/curves.pdf>