AP Calculus Geometry

These are some key geometric equations and concepts to be aware of for the AP Calculus exam (It is unlikely that you will see all of these on your exam, but knowing them can help you be more prepared). You will need to know some of these for related rates and optimization problems.

$r = radius$ $h = height$ $l = length$ $w = width$

$b = base$ $d = distance$ $A = Area$ $t = time$

$s_1, s_2, s_3, s_4 = sides\ of\ the\ shape$ $v = velocity$

3D Shapes:

Name	Volume	Surface Area
Cylinder	$\pi r^2 h$	$2\pi r^2 + 2\pi r h$
Right Circular Cone	$\frac{1}{3}\pi r^2 h$	$\pi r^2 + \pi r\sqrt{r^2 + h^2}$
Rectangular Prism	lwh	$2lw + 2lh + 2wh$
Sphere	$\frac{4}{3}\pi r^3$	$4\pi r^2$
Triangular Prism	$\frac{1}{2}bhl$	$bh + l(b + h + \sqrt{b^2 + h^2})$
Right Rectangular Pyramid	$\frac{1}{3}lwh$	$lw + l\sqrt{h^2 + (\frac{w}{2})^2} + w\sqrt{h^2 + (\frac{l}{2})^2}$

AP Calculus Geometry

2D Shapes:

Name	Area	Perimeter
Circle	πr^2	$2\pi r$ (Circumference)
Rectangle	lw	$2l + 2w$
Triangle	$\frac{1}{2}bh$	$s_1 + s_2 + s_3$
Trapezoid	$\frac{h(b_1+b_2)}{2}$	$s_1 + s_2 + s_3 + s_4$

Other:

Distance, Rate, and Time: $d = vt$

Pythagorean Theorem: $s_1^2 + s_2^2 = s_3^2$, where s_3 is the hypotenuse

Equilateral Triangle: $A = \frac{\sqrt{3}}{4}s^2$

Distance Formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Similar Triangles(Side Lengths): $AB/AD = AC/AE$