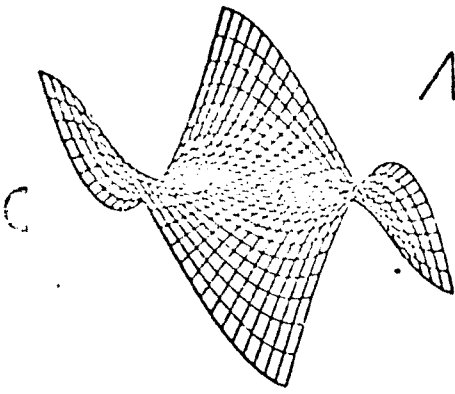


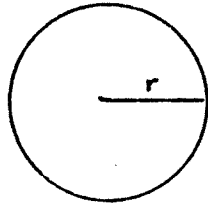
Mathematics Support Capsules

GENERAL FORMULAE
for use in
Related Rates, Max-Min, etc.

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Circles:

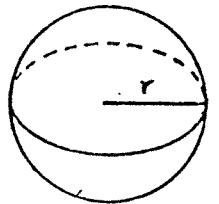


$$A = \pi r^2$$

$$\text{Circumference} = 2\pi r$$

(derivative of A)

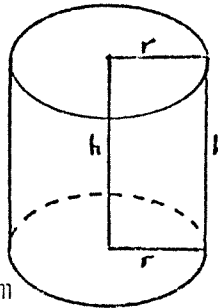
Spheres:



$$V = \frac{4}{3} \pi r^3$$

$$\text{Surface area} = 4\pi r^2 \quad (\text{derivative of } V)$$

Cylinders:

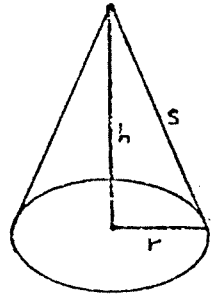


$$V = \pi r^2 h$$

$$\text{Surface} = 2\pi r h + 2\pi r^2$$

top and bottom

Cones:



$$V = \frac{1}{3} \pi r^2 h$$

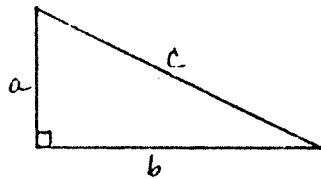
$$\text{Surface} = \pi r s + \pi r^2$$

bottom

Triangles:

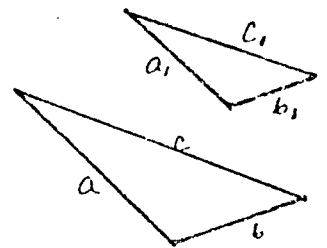
Pythagorean Theorem:

$$a^2 + b^2 = c^2$$



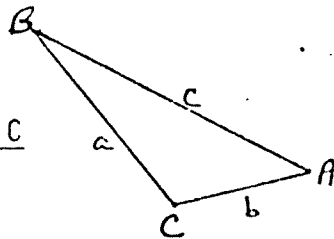
Similar Triangles:

$$\frac{a}{a_1} = \frac{b}{b_1} = \frac{c}{c_1}$$



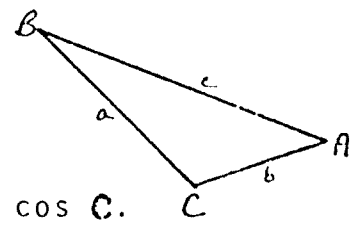
Law of Sines:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



Law of Cosines:

$$c^2 = b^2 + a^2 - 2ab \cos C$$



Those formulas in boxes will appear often in problem sets and exams. You are expected to know them and they will not be provided for you. So **MEMORIZE** them. Those not in boxes don't come up as much, so you don't have to memorize them.