Mat114
Review of Chapter 6.

1. Area and perimeter

   - Rectangle: $A = a \cdot h$, $P = 2(a + h)$.
   - Triangle: $A = \frac{a \cdot h}{2}$, $P = a + b + c$.
   - Parallelogram: $A = a \cdot h$, $P = 2(a + b)$.
   - Trapezoid: $A = \frac{(a+b)h}{2}$, $P = a + b + c + d$.
   - Circle: $A = \pi r^2$, $C = 2\pi r$.

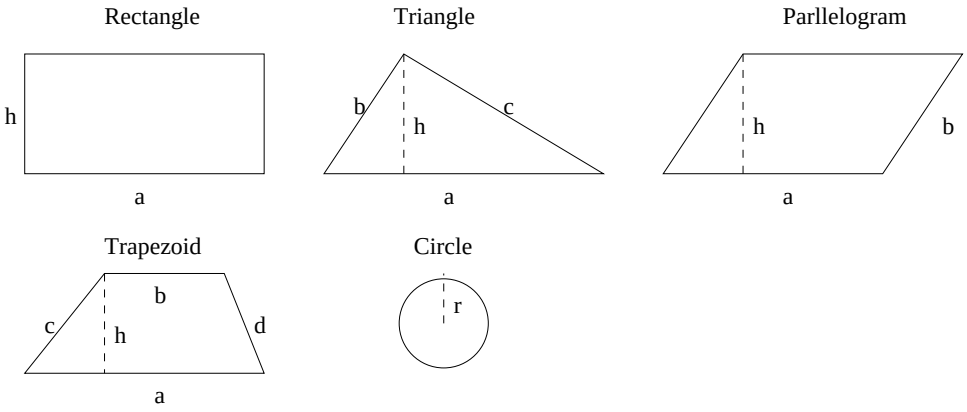


Figure 1: Area and perimeter

2. Heron's formula In a triangle if $a, b, c$ denote the length of three sides then the area of the triangle

$$A = \sqrt{s(s-a)(s-b)(s-c)},$$

   where $s = \frac{a+b+c}{2}$.

3. Pythagoras Theorem In a right triangle with legs of lengths $a$, $b$, and hypotenuse of length $c$,

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

4. Volume and surface areas

- Figure with an identical cross section has volume

$$V = A \cdot h$$

- Sphere has volume

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

  and surface area

$$A = 4\pi r^2.$$

- Cone or pyramid has volume

$$V = \frac{1}{3}A \cdot h.$$

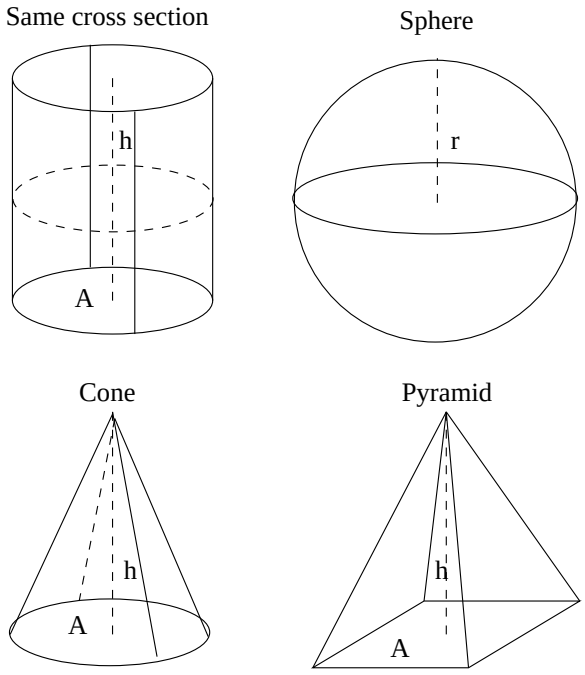


Figure 2: Volumes

5. Trigonometric functions In a right triangle

$$\sin a = \frac{opp}{hyp} \ , \ \cos a = \frac{adj}{hyp} \ , \ \tan a = \frac{opp}{adj}.$$

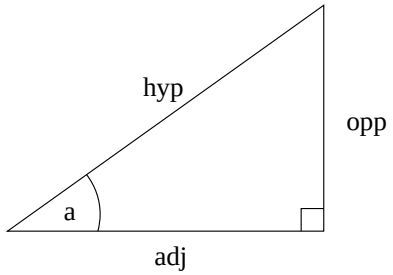


Figure 3: Trigonometry

| | $0^o$ | $30^o$ | $45^o$ | $60^o$ | $90^o$ |
|---|---|---|---|---|---|
| $\sin a$ | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 |
| $\cos a$ | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 |
| $\tan a$ | 0 | $\frac{1}{\sqrt{3}}$ | 1 | $\sqrt{3}$ | undef |