Achievable

ASVAB DUMP SHEET

Geometry: shapes, triangles, and solids

Area and perimeter

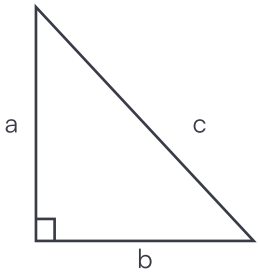
- **Area:** the space inside; **perimeter:** the distance around
- **Rectangle:** $A = lw$, $P = 2l + 2w$; its four angles total 360°
- **Square:** all four sides equal, so a side is $\sqrt{A}$: area 64 means side 8
- **Triangle:** $A = \frac{1}{2}bh$, where the height is the **altitude**, perpendicular to the base
- **Irregular shape:** split it into rectangles and triangles and add their areas

Triangles

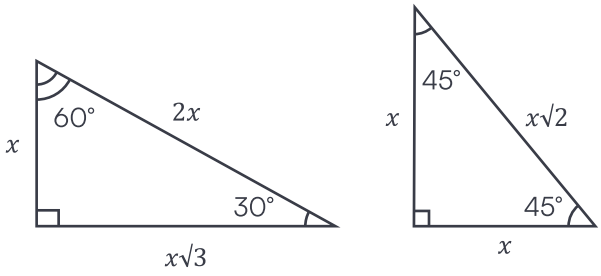
- The angles add to **180°**
- **Isosceles:** at least two equal sides (so equilateral counts), and the angles opposite them equal
- **Equilateral:** all sides equal; every angle 60°
- **Right:** one 90° angle; **obtuse:** one angle over 90°; **acute:** all under 90°
- **Similar triangles** have the same three angles, so their sides are in proportion: $\frac{x}{8} = \frac{45}{15}$, $x = 24$

Right triangles

- **Pythagorean theorem**, for a right triangle only: $a^2 + b^2 = c^2$, with c the hypotenuse, the longest side, opposite the right angle
- Legs 5 and 12 give a hypotenuse of 13; legs 3 and 4 give 5



- **30-60-90:** sides x, $x\sqrt{3}$, $2x$, opposite the 30°, 60° and 90° angles
- **45-45-90** (isosceles right): sides x, x, $x\sqrt{2}$



Polygons

- A closed shape of three or more straight sides; **regular**: all sides and angles equal
- Quadrilateral 4 sides, pentagon 5, hexagon 6
- **Interior angles** add to $(n - 2) \times 180°$ for n sides
- One angle of a regular polygon: that sum ÷ the number of sides; a hexagon's 720° gives 120°, a pentagon's 540° gives 108°

Circles

- **Radius** r: center to edge; **diameter** $d = 2r$: edge to edge through the center
- **Chord:** any line from edge to edge; **arc:** part of the circumference
- **Area** $A = \pi r^2$; **circumference** $C = 2\pi r$
- A circle is **360°**: the angles around its center add to 360°
- A **central angle** measures the same as the arc it cuts off
- **Arc length** $= \frac{\text{angle}}{360°} \times 2\pi r$: 60° of a radius-12 circle is 4π

Radians

- $360° = 2\pi$ radians; $180° = \pi$; $90° = \frac{\pi}{2}$
- Degrees to radians: $\times \frac{\pi}{180}$, so $120° = \frac{2\pi}{3}$
- Radians to degrees: $\times \frac{180}{\pi}$, so $\frac{5\pi}{4} = 225°$

Solids

- **Volume:** the area of the base × the height
- **Rectangular box:** $V = lwh$; **cylinder:** $V = \pi r^2 h$ (square the radius first)
- **Surface area:** add the area of every face; a cube has six equal squares, so side 2 gives 24
- **Density** $= \frac{\text{mass}}{\text{volume}}$, as in g/cm³: 180 g in a 4 × 3 × 5 cm box is 3 g/cm³