Achievable

ASVAB DUMP SHEET

Geometry: lines, angles, and coordinates

Lines and slope

- A **line** extends forever both ways; a **line segment** has two endpoints
- **Slope** $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$: steepness and direction
- **Positive:** up to the right; **negative:** down to the right
- **Zero:** horizontal (no rise); **undefined:** vertical (no run)

The equation of a line

- **Slope-intercept form:** $y = mx + b$; m is the slope, b the y-intercept
- $y = 2x - 4$: slope 2, crosses the y-axis at -4
- **From two points:** find m, then put one point in to find b
- $(-2, 7)$ and $(4, 1)$: $m = \frac{-6}{6} = -1$; $7 = 2 + b$, so $y = -x + 5$

Two lines

- **Different slopes:** cross at one point
- **Same slope, different intercepts:** parallel; never cross
- **Same slope and intercept:** the same line
- **Perpendicular:** cross at four 90° angles; slopes are **opposite reciprocals**, so flip the fraction and change the sign
- $\frac{2}{3} \to -\frac{3}{2}$ and $-5 \to \frac{1}{5}$

Angles

- **Right angle:** 90°; **straight angle:** 180°; **full circle:** 360°
- **Complementary:** add to 90°; **supplementary:** add to 180°
- **Vertical (opposite) angles**, across from each other where two lines cross, are equal
- **Congruent:** the same measure
- **Vertex:** where the two sides of an angle meet

Transversals

- A **transversal** crosses two parallel lines and makes eight angles of only two sizes
- Any two of them are **equal** or **supplementary**
- One angle 55°: every angle is 55° or 125°
- A parallelogram's opposite angles are equal and its neighboring angles supplementary

The coordinate plane

- x-axis across, y-axis up; they meet at the **origin**, $(0, 0)$
- A point (x, y): move along x first (right +), then y (up +)
- Quadrants, counterclockwise from the upper right: I $(+, +)$, II $(-, +)$, III $(-, -)$, IV $(+, -)$

Midpoint and distance

- **Midpoint:** $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$; $(-3, 8)$ and $(5, -2)$ give $(1, 3)$
- **Distance:** $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$, the Pythagorean theorem on the right triangle the two points make
- $(3, -4)$ and $(-2, 8)$: $\sqrt{5^2 + 12^2} = \sqrt{169} = 13$