Geometry Review Topics – Chapter 8

- Radius/tangent formulas with circles
  - A radius/tangent forms a right angle, allowing use of trig ratios and Pythagorean theorem
  - Tangent/tangent angles are add up to 180° with minor arc they form

- Circumference and arc length of circles
  - Circumference: $C = 2\pi r$ or $C = \pi d$
    - r is the radius of the circle and d the diameter
  - Arc Length: $L = 2\pi r\left(\frac{A}{360}\right)$ or $L = r\theta$
    - r is the radius, A is the central angle in degrees, and θ is the central angle in radians

- Area and sector areas of circles
  - Area: $A = \pi r^2$
    - r is the radius of the circle
  - Sector Area: $A_{sector} = \pi r^2\left(\frac{A}{360}\right)$ or $A_{sector} = \frac{1}{2}\theta r^2$
    - r is the radius, A is the central angle in degrees, and θ is the central angle in radians

- Surface area and volume of circular solids
  - Cylinder: $SA = 2\pi r^2 + 2\pi rh$ and $V = \pi r^2 h$
    - r is the radius of the base, h is the height
  - Cone: $SA = \pi rl + \pi r^2$ and $V = \frac{1}{3}\pi r^2 h$
    - r is the radius of the base, l is the slant height, h is the height

- Areas of equilateral and isosceles triangles
  - Equilateral triangle only: $A = \frac{s^2\sqrt{3}}{4}$
    - s is the length of one side of the triangle
  - Any triangle (given 1 side and perpendicular height): $A = \frac{1}{2}bh$
    - b is the base, h is the height, base and height are perpendicular
  - Non-right triangle (given 2 sides and included angle): $A = \frac{1}{2}ab\sin\theta$
    - a and b are any two sides in a triangle, θ is the angle between
  - Any triangle (given 3 sides and no angles): $A = \sqrt{s(s-a)(s-b)(s-c)}$
    - a,b, c are the side lengths, s is the semiperimeter

- Special right triangles (triples, 30-60-90, 45-45-90)
  - 4 main triples: 3-4-5, 5-12-13, 8-15-17, 7-24-25
  - 30-60-90: $x - x\sqrt{3} - 2x$
  - 45-45-90: $x - x - x\sqrt{2}$

- Basic trig ratios (sin, cos, tan)
  - SOH CAH TOA
  - $\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$, $\cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$, $\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$