

PreCal 0–100 Quiz Study Guide (Quarter 3)

Shapes

Sphere Surface Area: $S = 4\pi r^2$

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

Cone Surface Area: $S = \pi r^2 + \pi r l$

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

Cylinder Surface Area: $S = 2\pi r^2 + 2\pi r h$

Cylinder Volume: $V = \pi r^2 h$

Area of a Triangle: $A = \frac{1}{2}bh$

Area of an Equilateral Triangle: $A = \frac{s^2\sqrt{3}}{4}$

Equations

Slope-Intercept Form: $y = mx + b$

Point-Slope Form: $y - y_1 = m(x - x_1)$

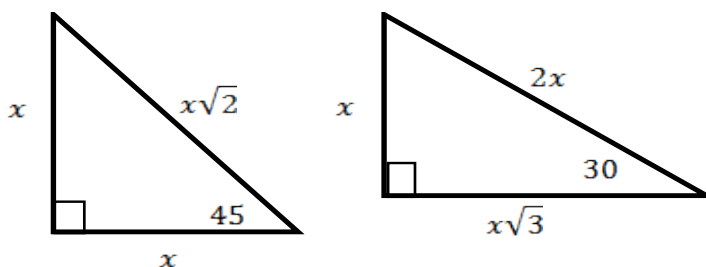
Standard Form: $Ax + By = C$

Vertex Form (quadratic): $y = a(x - h)^2 + k$

Equation of a Circle: $(x - h)^2 + (y - k)^2 = r^2$

Standard Trig Form: $y = a\sin(bx - c) + d$

Special Right Triangles



Quadratics

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Vertex of a Quadratic:

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right)$$

Quadratic Axis of Symmetry:

$$x = \frac{-b}{2a}$$

Basic Trigonometry

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

Factoring

Difference of two Squares:

$$A^2 - B^2 = (A - B)(A + B)$$

Sum of two Cubes:

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

Difference of two Cubes:

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

Converting Radians and Degrees

Degrees to Radians: $\text{deg} \cdot \frac{\pi}{180} = \text{rad}$

Radians to Degrees: $\text{rad} \cdot \frac{180}{\pi} = \text{deg}$

Quotient Properties

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

Trig Using x, y, and r

$$\sin \theta = \frac{y}{r}$$

$$\cos \theta = \frac{x}{r}$$

$$\tan \theta = \frac{y}{x}$$

$$\csc \theta = \frac{r}{y}$$

$$\sec \theta = \frac{r}{x}$$

$$\cot \theta = \frac{x}{y}$$

Reciprocal Identities

$$\sin \theta = \frac{1}{\csc \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

Even/Odd Properties

$$\sin(-\theta) = -\sin(\theta)$$

$$\csc(-\theta) = -\csc(\theta)$$

$$\cos(-\theta) = \cos(\theta)$$

$$\sec(-\theta) = \sec(\theta)$$

$$\tan(-\theta) = -\tan(\theta)$$

$$\cot(-\theta) = -\cot(\theta)$$

Pythagorean Identities

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

Trig Sum Formulas

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \sin \beta \cos \alpha$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$$

Double Angle Formulas

$$\sin(2\theta) = 2 \sin \theta \cos \theta$$

$$\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$$

$$\tan(2\theta) = \frac{2 \tan \theta}{1 - \tan^2 \theta}$$