# Maryland Comprehensive Assessment Program

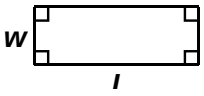
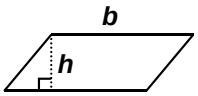
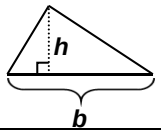
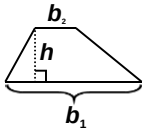
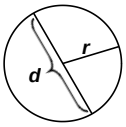
MCAP

## Mathematics Assessment

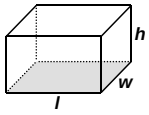
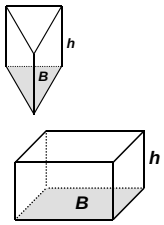
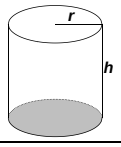
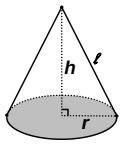
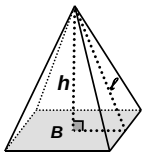
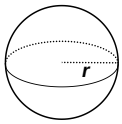
# High School Reference Sheet

## Formulas

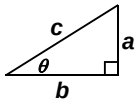
### Area ( *A* ) and Circumference ( *C* )

| Name | Shape | Formula |
|---|---|---|
| Rectangle |   | $A = lw$ |
| Parallelogram |   | $A = bh$ |
| Triangle |   | $A = \frac{1}{2}bh$ |
| Trapezoid |   | $A = \frac{1}{2}(b_1+b_2)h$ |
| Circle |   | $A = \pi r^2$<br>$C = 2\pi r$<br>$C = \pi d$ |

### Volume ( *V* ) and Surface Area ( *SA* )

| Name | Shape | Formula |
|---|---|---|
| Right Rectangular Prism |   | $V = lwh$<br>$SA = 2lw + 2hw + 2lh$ |
| General Prism |   | $V = Bh$<br>$SA$ = Sum of the areas of the faces |
| Right Circular Cylinder |   | $V = \pi r^2 h$<br>$SA = 2\pi r^2 + 2\pi rh$ |
| Right Circular Cone |   | $V = \frac{1}{3}\pi r^2 h$<br>$SA = \pi r^2 + \pi r\ell$ |
| Right Pyramid |   | $V = \frac{1}{3}Bh$<br>$SA = B + \frac{1}{2}P\ell$ |
| Sphere |   | $V = \frac{4}{3}\pi r^3$<br>$SA = 4\pi r^2$ |

### Formulas for Right Triangles



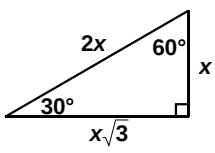

Pythagorean Theorem:

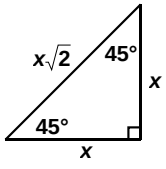
$a^2 + b^2 = c^2$

Trigonometric Ratios:

$\sin\theta = \frac{a}{c}$ $\cos\theta = \frac{b}{c}$ $\tan\theta = \frac{a}{b}$

### Special Right Triangles




### Polygon Angle Formulas

Interior Angle Formula: $180°(n-2)$

Angle Measure of Regular Polygon: $\frac{180°(n-2)}{n}$

## Formulas

### Equations of a Line

Standard Form:

$Ax + By = C$

where A and B are not both zero

Slope-Intercept Form:

$y = mx + b$

where $m$ = slope and $b$ = $y$-intercept

Point-Slope Form:

$y - y_1 = m(x - x_1)$

where $m$ = slope and $(x_1, y_1)$ is a point on the line

### Coordinate Geometry Formulas

Let $(x_1, y_1)$ and $(x_2, y_2)$ be two coordinate pairs

slope = $\frac{y_2 - y_1}{x_2 - x_1}$ where $x_2 \neq x_1$

midpoint = $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

### Arithmetic Sequence

$a_n = a_1 + (n-1)d$

### Geometric Sequence

$a_n = a_1 r^{n-1}$

### Geometric Series

$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$

### Quadratic Formula

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

### Distance Traveled

$d = rt$

### Arc Length

$S = r\theta$

(where $\theta$ is in radians)

### Simple Interest

$I = prt$

### Compound Interest

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

### Continuously Compounded Interest

$A = Pe^{rt}$

## Conversions

### Angle Measurements

1 Radian = $\frac{180}{\pi}$ Degrees

1 Degree = $\frac{\pi}{180}$ Radians

### Weights

1 pound = 16 ounces
1 pound = 0.454 kilograms
1 ton = 2000 pounds
1 kilogram = 2.2 pounds

### Distances

1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 meter = 39.37 inches
1 inch = 2.54 centimeters

### Volumes

1 cup = 8 fluid ounces
1 gallon = 4 quarts
1 pint = 2 cups
1 gallon = 3.785 liters
1 quart = 2 pints
1 liter = 0.264 gallons
1 liter = 1000 cubic centimeters