# **Mathematics Reference Sheet**

# Conversions

#### **U.S.** Customary

1 foot = 12 inches 1 yard = 3 feet 1 mile = 5280 feet 1 acre  $\approx$  43,560 square feet 1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 gallon = 231 cubic inches 1 pound = 16 ounces 1 ton = 2000 pounds 1 cubic foot  $\approx$  7.5 gallons

# Metric

centimeter = 10 millimeters
meter = 100 centimeters
kilometer = 1000 meters
liter = 1000 milliliters
kiloliter = 1000 liters
milliliter = 1 cubic centimeter
liter = 1000 cubic centimeters
cubic millimeter = 0.001 milliliter
gram = 1000 milligrams
kilogram = 1000 grams

# **Number Properties**

Commutative Properties of Addition and Multiplication

a + b = b + a $a \cdot b = b \cdot a$ 

Associative Properties of Addition and Multiplication

(a+b) + c = a + (b+c) $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ 

Addition Property of Zero

a + 0 = a

Multiplication Properties of Zero and One

 $a \cdot 0 = 0$ 

 $a \cdot 1 = a$ 

Distributive Property: a(b + c) = ab + aca(b - c) = ab - ac

### **U.S. Customary to Metric**

1 inch = 2.54 centimeters 1 foot  $\approx$  0.3 meter 1 mile  $\approx$  1.61 kilometers 1 quart  $\approx$  0.95 liter 1 gallon  $\approx$  3.79 liters 1 cup  $\approx$  237 milliliters 1 pound  $\approx$  0.45 kilogram 1 ounce  $\approx$  28.3 grams 1 gallon  $\approx$  3785 cubic centimeters

#### Time

1 minute = 60 seconds 1 hour = 60 minutes 1 hour = 3600 seconds 1 year = 52 weeks

#### Temperature

$$C = \frac{5}{9}(F - 32)$$
$$F = \frac{9}{5}C + 32$$

#### Metric to U.S. Customary

1 centimeter  $\approx 0.39$  inch 1 meter  $\approx 3.28$  feet 1 kilometer  $\approx 0.62$  mile 1 liter  $\approx 1.06$  quarts 1 liter  $\approx 0.26$  gallon 1 kilogram  $\approx 2.2$  pounds 1 gram  $\approx 0.035$  ounce 1 cubic meter  $\approx 264$  gallons

### **Properties of Equality**

Addition Property of Equality If a = b, then a + c = b + c. Subtraction Property of Equality If a = b, then a - c = b - c. Multiplication Property of Equality If a = b, then  $a \cdot c = b \cdot c$ . Multiplicative Inverse Property  $n \cdot \frac{1}{n} = \frac{1}{n} \cdot n = 1, n \neq 0$ Division Property of Equality If a = b, then  $a \div c = b \div c, c \neq 0$ . Squaring both sides of an equation If a = b, then  $a^2 = b^2$ . Cubing both sides of an equation If a = b, then  $a^3 = b^3$ .

## **Properties of Inequality**

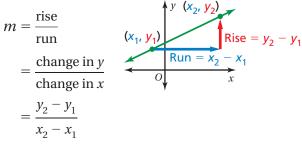
Addition Property of Inequality If a > b, then a + c > b + c.

Subtraction Property of Inequality If a > b, then a - c > b - c.

### **Properties of Exponents**

Product of Powers Property:  $a^m \cdot a^n = a^{m+n}$ Quotient of Powers Property:  $\frac{a^m}{a^n} = a^{m-n}, a \neq 0$ Power of a Power Property:  $(a^m)^n = a^{mn}$ 

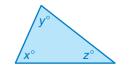
### **Slope**



### **Angles of Polygons**

**Interior Angle Measures of a Triangle** 

x + y + z = 180

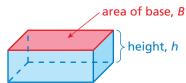


#### **Interior Angle Measures of a Polygon**

The sum *S* of the interior angle measures of a polygon with *n* sides is  $S = (n - 2) \cdot 180^{\circ}$ .

### **Formulas in Geometry**

#### Prism

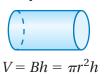


S = areas of bases+ areas of lateral faces V = Bh

Circle



 $C = \pi d$  or  $C = 2\pi r$  $A = \pi r^2$  Cylinder



Multiplication Property of Inequality

If a > b and c is positive, then  $a \cdot c > b \cdot c$ . If a > b and c is negative, then  $a \cdot c < b \cdot c$ .

**Division Property of Inequality** 

If a > b and c is positive, then  $a \div c > b \div c$ . If a > b and c is negative, then  $a \div c < b \div c$ .

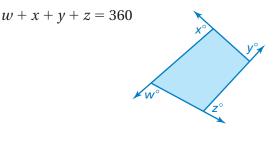
Power of a Product Property:  $(ab)^m = a^m b^m$ 

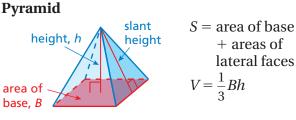
Zero Exponents:  $a^0 = 1, a \neq 0$ Negative Exponents:  $a^{-n} = \frac{1}{a^n}, a \neq 0$ 

### **Equations of Lines**

Slope-intercept form y = mx + bStandard form  $ax + by = c, a, b \neq 0$ Point-slope form  $y - y_1 = m(x - x_1)$ 

#### **Exterior Angle Measures of a Polygon**







 $V = \frac{1}{2}Bh = \frac{1}{2}\pi r^2 h$ 



