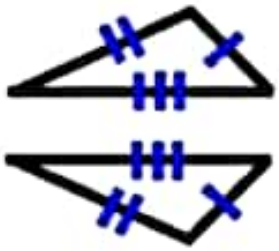
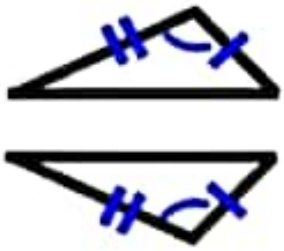
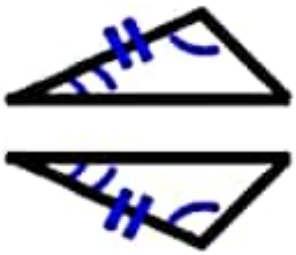
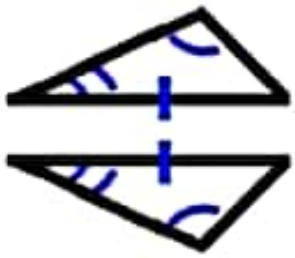
- $(a+b)^2 = a^2 + 2ab + b^2$
- $(a-b)^2 = a^2 - 2ab + b^2$
- $a^2 + b^2 = (a+b)^2 - 2ab$
- $a^2 - b^2 = (a+b) - (a-b)$
- $(a+b)^2 = (a-b)^2 + 4ab$
- $(a-b)^2 = (a+b)^2 - 4ab$
- $a^2 + b^2 = (a-b)^2 + 2ab$
- $2(a^2+b^2) = (a+b)^2 + (a-b)^2$
- $(a+b+c)^2 = (a^2 + b^2 + c^2) + 2(ab + bc + ca)$
- $(a^2 + b^2 + c^2) = (a+b+c)^2 - 2(ab + bc + ca)$
- $2(ab + bc + ca) = (a+b+c)^2 - (a^2 + b^2 + c^2)$
- $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
- $(a+b)^3 = a^3 + b^3 + 3ab(a+b)$
- $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$
- $(a-b)^3 = a^3 - b^3 - 3ab(a-b)$
- $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
- $a^3 + b^3 = (a+b)^3 - 3ab(a+b)$
- $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
- $a^3 - b^3 = (a-b)^3 + 3ab(a-b)$
- $(a+b+c)^3 = a^3 + b^3 + c^3 + 3(a+b)(b+c)(c+a)$
- $a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$
- $a^3 + b^3 + c^3 - 3abc = \frac{1}{2}(a+b+c)\{(a-b)^2 + (b-c)^2 + (c-a)^2\}$

- $4ab = (a+b)^2 - (a-b)^2$
- $ab = \left(\frac{a+b}{2}\right)^2 - \left(\frac{a+b}{2}\right)^2$
- $(x+a)(x+b) = x^2 + (a+b)x + ab$
- $(x+a)(x-b) = x^2 + (a-b)x - ab$
- $(x-a)(x+b) = x^2 + (b-a)x - ab$
- $(x-a)(x-b) = x^2 - (a+b)x + ab$
- $(x+p)(x+q)(x+r) = x^3 + (p+q+r)x^2 + (pq + qr + rp)x + pqr$
- $bc(b-c) + ca(c-a) + ab(a-b) = -(b-c)(c-a)(a-b)$
- $a^2(b-c) + b^2(c-a) + c^2(a-b) = -(b-c)(c-a)(a-b)$
- $a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2) = (b-c)(c-a)(a-b)$
- $a^3(b-c) + b^3(c-a) + c^3(a-b) = -(b-c)(c-a)(a-b)(a+b+c)$
- $b^2c^2(b^2-c^2) + c^2a^2(c^2-a^2) + a^2b^2(a^2-b^2) = -(b-c)(c-a)(a-b)(b+c)(c+a)(a+b)$
- $(ab + bc + ca)(a+b+c) - abc = (a+b)(b+c)(c+a)$
- $(b+c)(c+a)(a+b) + abc = (a+b+c)(ab + bc + ca)$

Congruence	Explanation	Diagram
SSS	When two triangles have three corresponding sets of sides congruent, use SSS to say the triangles are congruent.	
SAS	When two triangles have two pairs of sides congruent and the angles between them are congruent, use SAS to say the triangles are congruent.	
ASA	When two triangles have two pairs of angles congruent and the sides between them are congruent, use ASA to say the triangles are congruent.	
AAS	When two triangles have two pairs of angles congruent and the sides not between them are congruent, use AAS to say the triangles are congruent.	

$D = \frac{m}{V}$	D density $\left(\frac{g}{cm^3} = \frac{kg}{m^3}\right)$ m mass V volume
$d = v \cdot t$	d distance **m** v velocity **m/s** t time **s**
$a = \frac{vf - vi}{t}$	a acceleration **m/s²** vf final velocity **m/s** vi initial velocity **m/s** t time **s**
$d = vi \cdot t + \frac{1}{2} \cdot a \cdot t^2$	d distance **m** vi initial velocity **m/s** t time **s** a acceleration **m/s²**
$F = m \cdot a$	F net force **N** (=newtons) m mass **kg** a acceleration **m/s²**
$Fg = \frac{G \cdot m_1 \cdot m_2}{d^2}$	Fg force of gravity **N** G universal gravitational constant $\left(G = 6.67 \times 10^{-11} \frac{N \cdot m^2}{kg^2}\right)$ m_1, m_2 masses of the two objects **kg** d separation distance **m**
$p = m \cdot v$	p momentum **kg·m/s** m mass **kg** v velocity **m/s**
$P = \frac{W}{t}$	P power **W** (=watts) W work **J** t time **s**
$K.E. = \frac{1}{2} \cdot m \cdot v^2$	K.E. kinetic energy **J** m mass **kg** v velocity **m/s**
$Fe = \frac{k \cdot Q_1 \cdot Q_2}{d^2}$	Fe electrical force **N** k Coulomb's constant $\left(k = 9 \times 10^9 \frac{N \cdot m^2}{C^2}\right)$ Q_1, Q_2 are electrical charges **C** d separation distance **m**
$V = \frac{W}{Q}$	V electrical potential difference **V** (= volts) W work done **J** Q electrical charge moving **C**
$I = \frac{Q}{t}$	I electrical current **A** (= amperes) Q electrical charge moving **C** t time **s**
$W = V \cdot I \cdot t$	W electrical energy **J** V voltage **V** I current **A** t time **s**
$P = V \cdot I$	P power **W** V voltage **V** I current **A**
	H heat energy **J**