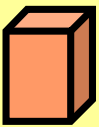
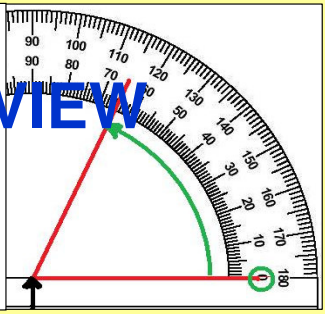
NUMBER OF DIMENSIONS and TRAITS	NAME	EX.
0 DIMENSIONS: no length, width, or height	POINT	.
1 DIMENSION: length only	LINE	
	LINE SEGMENT	
	RAY	
2 DIMENSIONS: length and width	POLYGON	
3 DIMENSIONS: length, width and height	POLYHEDRON	

REGULAR POLYHEDRONS (PLATONIC SOLIDS)

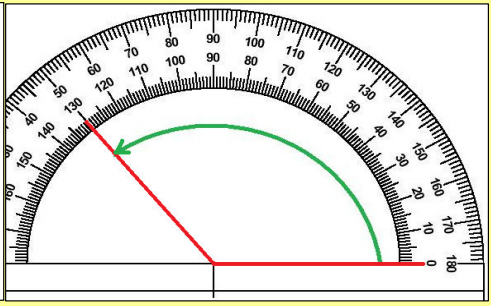
shape	name	faces	edges	vertices
	tetrahedron	4	6	4
	hexahedron	6	12	8
	octahedron	8	12	6
	dodecahedron	12	30	20
	icosahedron	20	30	12

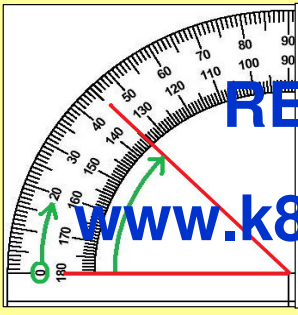
MEASURING ANGLES

1. Put the protractor's arrow on the vertex.
2. Turn it so the 0^o line is on one side.
3. Read the number: 65^o.



With obtuse angles, use the numbers to get a reading that is greater than 90^o. Ans.: 130^o.





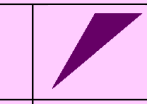
When the left side of the angle is on the 0^o line, you will need to read the answer off the outer set of numbers. (Ans.: 45^o)

ANGLES AND TRIANGLES

Triangles are named by the lengths of their sides. Angles and triangles are named by the openness of angles.

right angle (= 90°)	
acute angle (< 90°)	
obtuse angle (> 90°)	

TRIANGLES

			
name	equilateral	isosceles	scalene
sides	3 equal	2 equal	0 equal
angles	3 equal	2 equal	0 equal
			
name	right	acute	obtuse
angles	one=90°	all<90°	one>90°

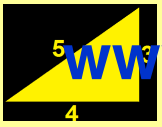
The sum of the angles of a triangle is 180°. This can be seen by aligning the angles. A straight line equals 180°.

PYTHAGOREAN THEOREM

There is a special law relating the sides of a right triangle.

The square of the hypotenuse is equal to the sum of the squares of the other two sides: $c^2 = a^2 + b^2$

The simplest Pythagorean triple—a right triangle whose sides are integers—is 3, 4, and 5; the next is 5,12 and 13.



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

$5^2 = 3^2 + 4^2$

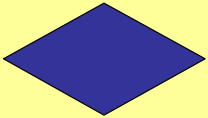
$25 = 9 + 16$

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

$13^2 = 5^2 + 12^2$

$169 = 25 + 144$

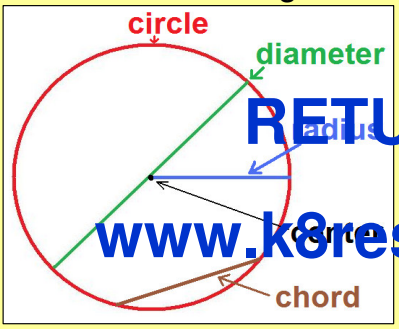
QUADRILATERALS

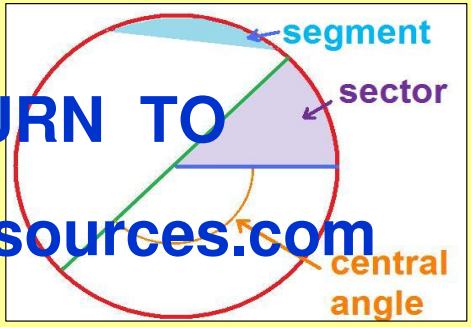
SHAPE	SIDES & ANGLES
QUADRILATERAL	4 sides 4 angles
TRAPEZOID 	1 pair parallel sides 4 angles
PARALLELOGRAM 	Opposite sides parallel Opposite sides equal Opposite angles equal and adjacent ones supplementary (add to 180°)
RHOMBUS 	Opposite sides parallel All four sides equal Opposite angles equal and adjacent ones supplementary
RECTANGLE 	Opposite sides parallel Opposite sides equal Adjacent sides perpendicular 4 right angles
SQUARE 	Opposite sides parallel All four sides equal Adjacent sides perpendicular 4 right angles

POLYGONS AND CIRCLES

polygon	ex.	sides & angles	internal triangles	internal degrees*
triangle		3	1	180
quadrilateral		4	2	360
pentagon		5	3	540
hexagon		6	4	720
octagon		8	6	1080
n-gon		n	n-2	(n-2)x180

*The number of degrees of the internal angles of a polygon can be found by multiplying 180° by the number of triangles that could be drawn inside it.

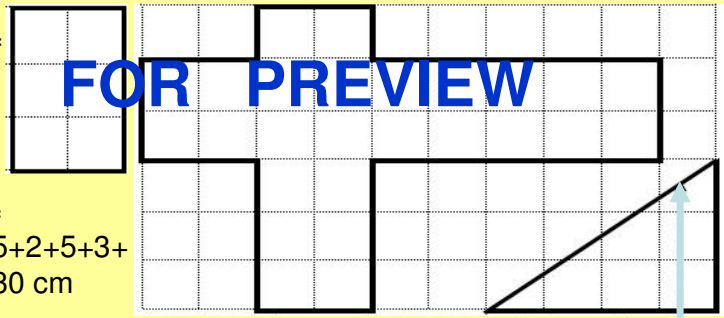




PERIMETER—distance around a shape

Count the centimeters around the sides, or add up the sides.

Perimeter=
2+3+2+3=
10 cm



Perimeter=
2+1+2+1+5+2+5+3+
2+3+2+2=30 cm

P = 3 + 4 + 5 = 12 cm (Use a ruler to measure slanted lines.)

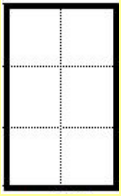
AREA OF A RECTANGLE

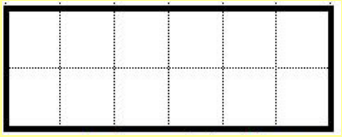
Count the square centimeters inside the shape. Multiply the length times the width. Area is in square units.

A = l x w

= 2 x 3

= 6 sq. cm





A = l x w = 6 x 2 = 12 sq. cm

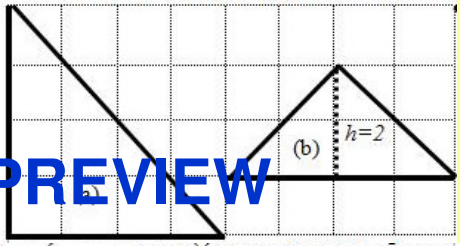
AREA OF A PARALLELOGRAM

Count squares and triangles, or multiply the base times the height.
A=bxh=7x3
= 21 sq. cm

AREA OF TRIANGLES

A = ½b x h

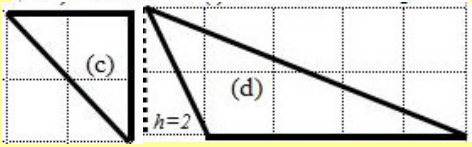
Count squares (1 sq. cm) and triangles (here 1/2 sq. cm), or multiply ½ x base x height.



$A_{(a)}$ = ½ x 4 x 4 = 8 sq. cm

$A_{(b)}$ = ½ x 4 x 2 = 4 sq. cm

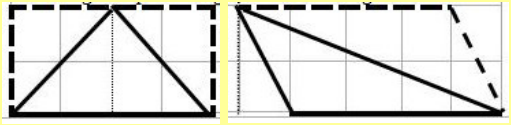
Height is perpendicular to the base.



$A_{(c)}$ = ½ x 2 x 2 = 2 sq. cm

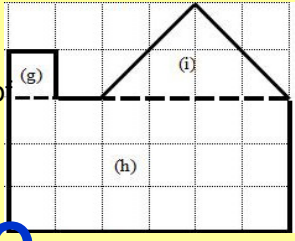
$A_{(d)}$ = ½ x 4 x 2 = 4 sq. cm

The triangle's area is half the area of its enclosing rectangle or parallelogram, showing A = ½ x b x h.



AREA OF IRREGULAR SHAPES

Divide the shape into rectangles and triangles. Count squares and triangles, or calculate area of rectangles (l×w) and triangles (1/2 b×h). Add.



$A = A_{(g)} + A_{(h)} + A_{(i)}$

$= (1x1) + (6x3) + (1/2x4x2)$

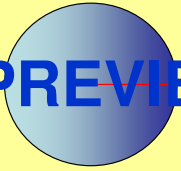
$= 1 + 18 + 4 = 23$ sq cm

It may be easier to subtract the area of a small missing piece from a would-be full rectangle.

CIRCUMFERENCE OF A CIRCLE

$C = 2 \times \pi \times r$

AREA OF A CIRCLE



$A = \pi \times r^2$

π is a constant roughly equal to 3 1/7 or 22/7.

π is a never-ending decimal beginning with

3.14159265358979323846264338327950288419716939937510

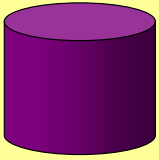
VOLUME OF A PRISM

$V = l \times w \times h$

VOLUME OF A PYRAMID

$V = 1/3 \times l \times w \times h$

VOLUME OF A CYLINDER

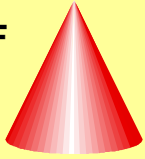


$V = \pi \times r^2 \times h$

VOLUME OF A SPHERE

$V = 4/3 \times \pi \times r^3$

VOLUME OF A CONE



$V = 1/3 \times \pi \times r^2 \times h$

Volume is given in cubic units. For example, 24 cubic inches.