

تنويه: يتم حل جميع اسئلة الكتاب اوراق العمل + شرح الدروس للطلاب خلال الحصص الخصوصية من معهد رواد التعليمية مع كادر متخصص من المعلمين

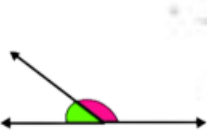
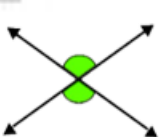
((تحتفظ رواد التعليمية بكامل حقوق النشر والطبع، والعلامة التجارية، وحقوق الملكية الفكرية، وغيرها من ملكيات المعلومات الواردة))

## Grade 7 elite

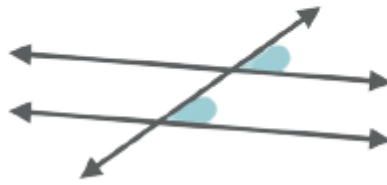
### Math – Formula sheet

This paper includes are the formula required for the final exam.

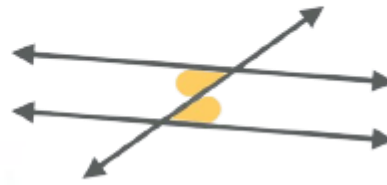
يحتوي هذا الفايل على جميع القوانين والمعلومات المطلوبة في الاختبار النهائي للصف السابع نخبه

| Supple-<br>mentary<br>Angles                                                        | Comple-<br>mentary<br>Angles                                                        | Adjacent<br>Angle                                                                   | Vertical<br>Angle                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| Two adjacent angles that add up to $180^\circ$                                      | Two adjacent angles that add up to $90^\circ$                                       | Two angles that are next to each other                                              | Two angles across from each other formed by two intersecting lines                    |

# ANGLE RELATIONSHIPS



corresponding angles



alternate interior angles

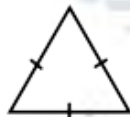


vertical angles

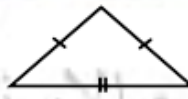


alternate exterior angles

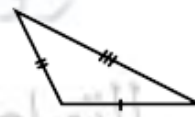
## Classifying Triangles by their Sides



**Equilateral** - all sides congruent

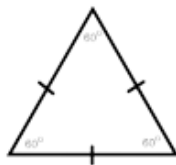


**Isosceles** - two sides congruent



**Scalene** - no sides are congruent

## Classifying Triangles by their Angles



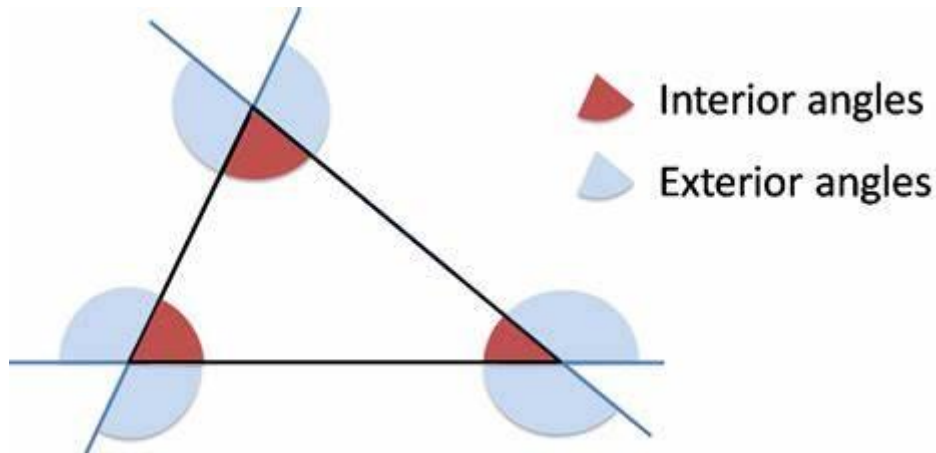
**Acute** - all angles acute



**Obtuse** - one obtuse angle



**Right** - one right angle



The sum of all interior angles = 180

Any exterior angle = the sum of the two other interiors

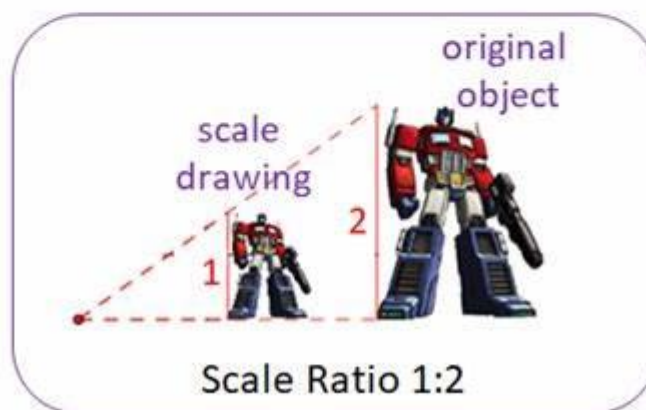
**Be careful:** To have a triangle, the greatest side should be less than the sum of the two other sides!

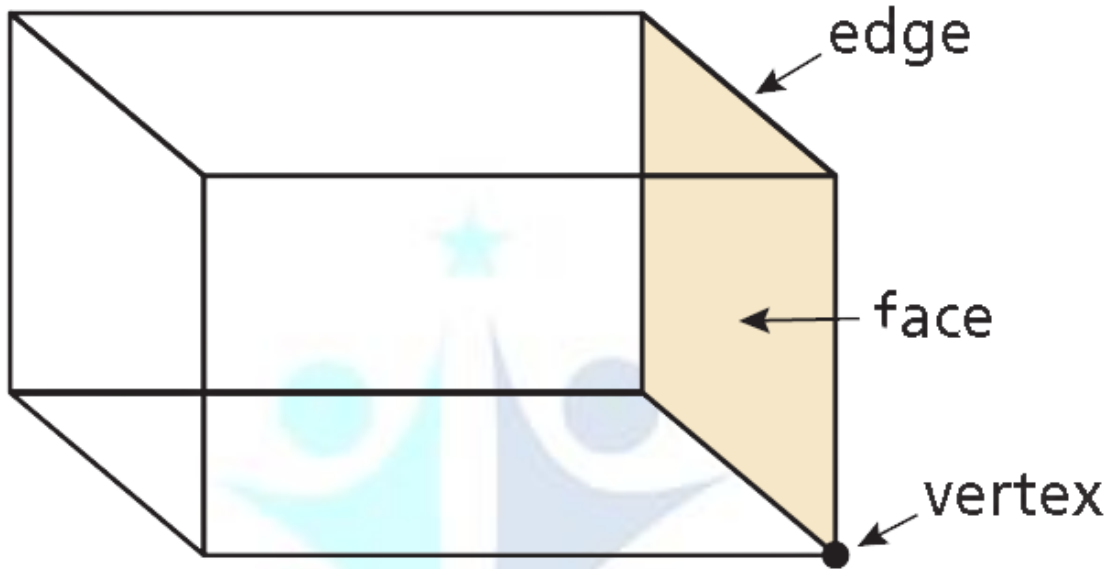
## Scale Drawing

A scale drawing is a drawing which has been reduced or enlarged from its original size, to a specified scale.

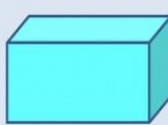
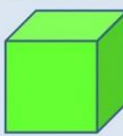
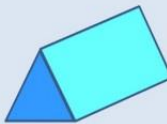
A scale is a ratio.

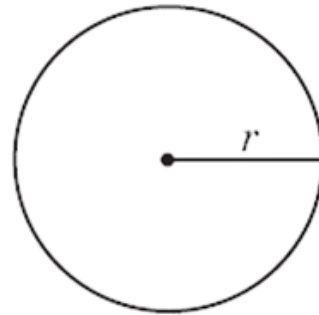
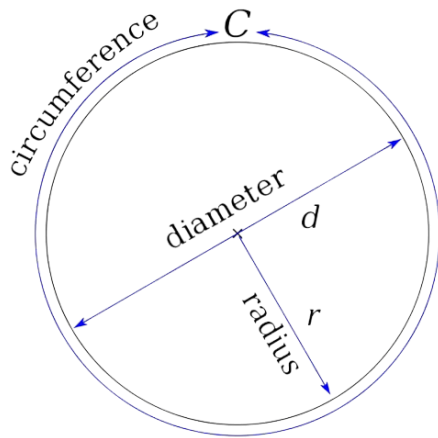
size of scale drawing : size of original object



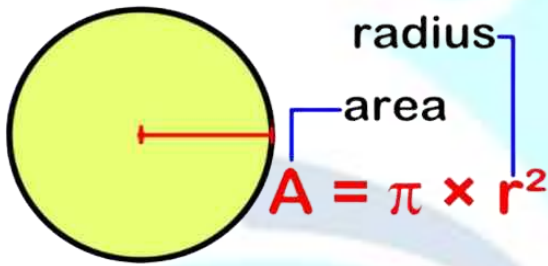


## Properties of 3D shapes

|                                                                                                                                                                 |                                                                                                                                                              |                                                                                                                                                                         |                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cone</b><br><br><b>2 Faces</b><br><b>1 Edge</b><br><b>1 Vertex</b>        | <b>Sphere</b><br><br><b>1 Face</b><br><b>1 Edge</b><br><b>0 Vertices</b>  | <b>Tetrahedron</b><br><br><b>4 Faces</b><br><b>6 Edges</b><br><b>4 Vertices</b>      | <b>Cuboid</b><br><br><b>6 Faces</b><br><b>12 Edges</b><br><b>8 Vertices</b>              |
| <b>Cylinder</b><br><br><b>3 Faces</b><br><b>2 Edges</b><br><b>0 Vertices</b> | <b>Cube</b><br><br><b>6 Faces</b><br><b>12 Edges</b><br><b>8 Vertices</b> | <b>Triangular Prism</b><br><br><b>5 Faces</b><br><b>9 Edges</b><br><b>6 Vertices</b> | <b>Square-based pyramid</b><br><br><b>5 Faces</b><br><b>8 Edges</b><br><b>5 Vertices</b> |

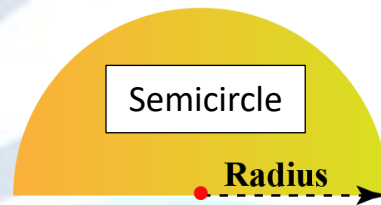


$$C = 2\pi r \text{ or } \pi d$$



$$A = \pi \times r^2$$

$$\text{Area} = \frac{\pi}{2} \times \text{radius}^2$$



## Quadrilaterals

## Formulas

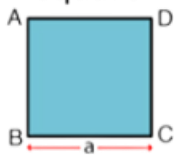
### Rectangle



$$\text{Area (A)} = w \times l$$

here, w = width, l = length

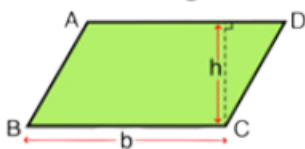
### Square



$$\text{Area (A)} = a^2$$

here, a = side

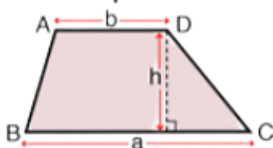
### Parallelogram



$$\text{Area (A)} = b \times h$$

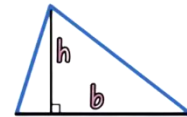
here, b = base, h = height

### Trapezoid



$$\text{Area (A)} = \frac{1}{2} (a + b) \times h$$

here, a = long base  
b = short base  
h = height

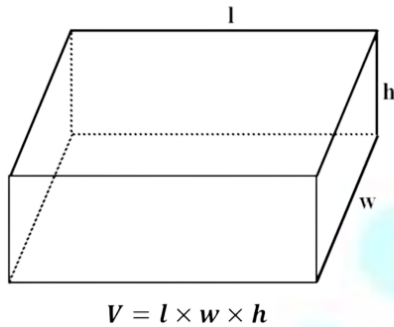


$$\text{Area} = \frac{1}{2} \times b \times h = \frac{bh}{2}$$

Volume of a prism =  $B.h$

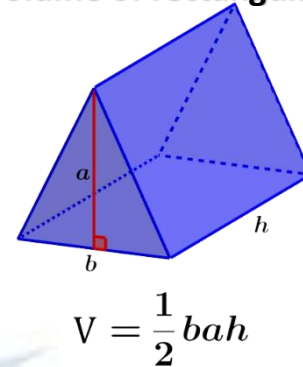
B is the area of the base (it might change according to the shape of the base)

### Volume of a Rectangular Prism



Here  $B = b.a$  because the base is a rectangle

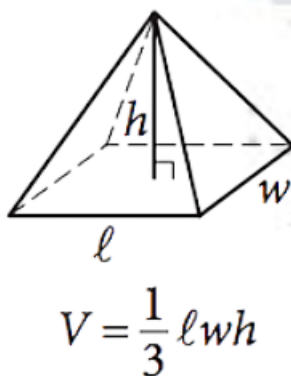
### Volume of rectangular prism



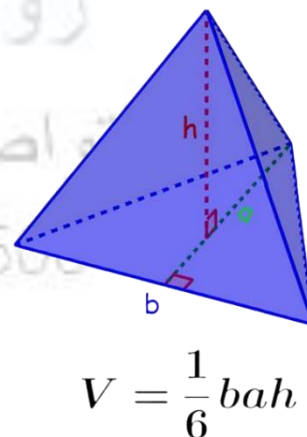
Here  $B = \frac{1}{2} b.a$  because the base is a triangle

Volume of a pyramid =  $\frac{1}{3} B.h$

B is the area of the base (it might change according to the shape of the base)



Here  $B = b.a$  because the base is a rectangle



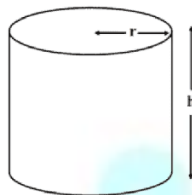
Here  $B = \frac{1}{2} b.a$  because the base is a triangle

$V = \frac{1}{3} Bh = \frac{1}{3} * \frac{1}{2} ba h = \frac{1}{6} bah$

Volume of a cylinder =  $B \cdot h$

B is the area of the base (it might change according to the shape of the base)

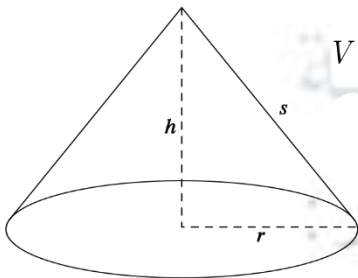
$$V = \pi r^2 h$$



Here  $B = \pi r^2$  because the base is a circle

Volume of a cone =  $\frac{1}{3} B \cdot h$

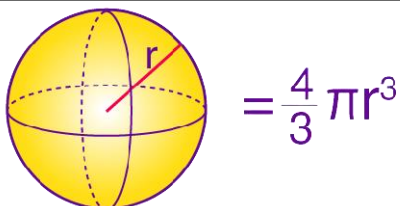
B is the area of the base (it might change according to the shape of the base)



$$V = \frac{\pi r^2 h}{3}$$

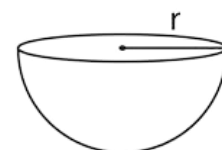
Here  $B = \pi r^2$  because the base is a circle

Volume of sphere



$$= \frac{4}{3} \pi r^3$$

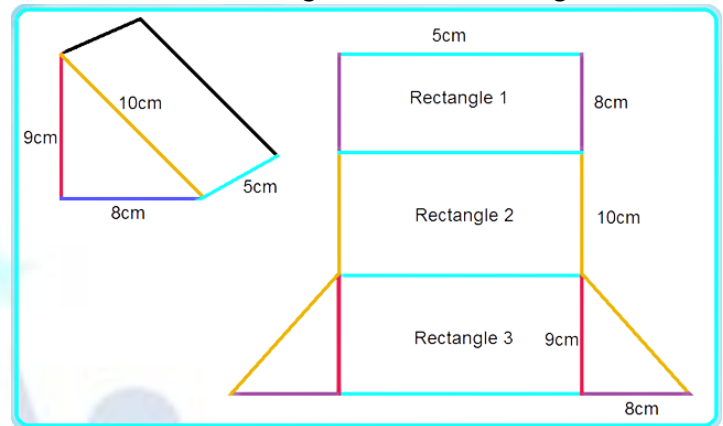
Hemisphere



$$V = \frac{2}{3} \pi r^3$$

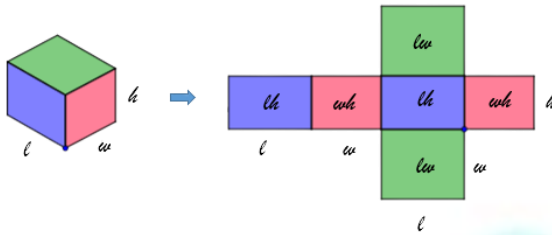
## Surface area of triangular prism

2 Area of triangle + area of 3 rectangles

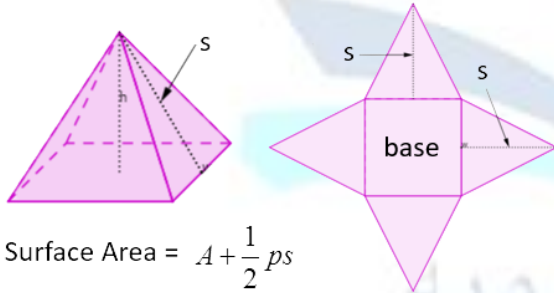


## Surface Area Rectangular Prism

$$\text{Surface Area} = 2(lh + wh + lw)$$



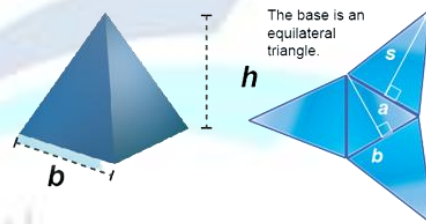
## Surface Area of Pyramid



$$\text{Surface Area} = A + \frac{1}{2}ps$$

$A$  = Area of base  
 $p$  = perimeter of base  
 $s$  = slant height

## Surface area of triangular pyramid

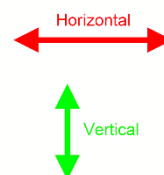


$$\text{Surface Area} = \frac{1}{2}b \cdot a + \frac{3}{2}b \cdot s$$

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## Vertical and horizontal translation

### الازاحات الافقية والعمودية



|                   |                              |
|-------------------|------------------------------|
| Up by a           | $(x,y) \gg \gg \gg (x, y+a)$ |
| Down by a         | $(x,y) \gg \gg \gg (x, y-a)$ |
| To the right by a | $(x,y) \gg \gg \gg (x+a, y)$ |
| To the left by a  | $(x,y) \gg \gg \gg (x-a, y)$ |

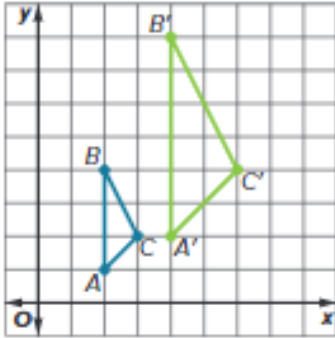
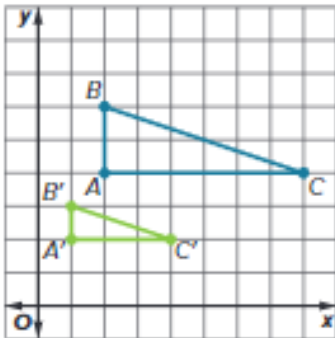
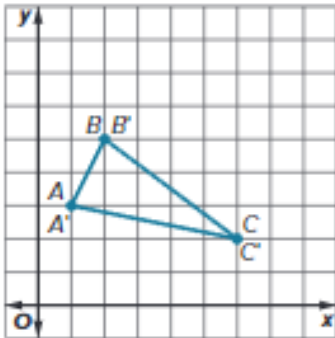
### الانعكاس - Reflection

| Reflection over |                             |
|-----------------|-----------------------------|
| x-axis          | $(x,y) \rightarrow (x, -y)$ |
| y-axis          | $(x,y) \rightarrow (-x, y)$ |

### الدوران - Rotation

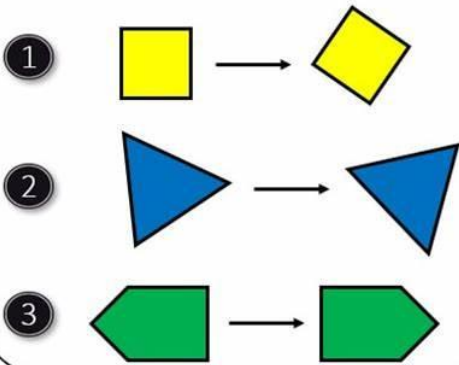
| TYPE OF ROTATION                                             | Point on the pre-image | Point on the image (After rotation) |
|--------------------------------------------------------------|------------------------|-------------------------------------|
| Rotation of $90^\circ$<br>(clock wise)                       | $(x, y)$               | $(y, -x)$                           |
| Rotation of $90^\circ$<br>(counter clock wise)               | $(x, y)$               | $(-y, x)$                           |
| Rotation of $180^\circ$<br>(clock wise & counter clock wise) | $(x, y)$               | $(-x, -y)$                          |
| Rotation of $270^\circ$<br>(clock wise)                      | $(x, y)$               | $(-y, x)$                           |
| Rotation of $270^\circ$<br>(counter clock wise)              | $(x, y)$               | $(y, -x)$                           |

## التمدد - Dilation

| Enlargement                                                                                       |                                                                                      |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Words                                                                                             | Model                                                                                |
| A dilation with a scale factor of $k$ will be an image larger than the original if $k > 1$ .      |    |
| Symbols                                                                                           |                                                                                      |
| $(x, y) \rightarrow (2x, 2y)$                                                                     |                                                                                      |
| Reduction                                                                                         |                                                                                      |
| Words                                                                                             | Model                                                                                |
| A dilation with a scale factor of $k$ will be an image smaller than the original if $0 < k < 1$ . |  |
| Symbols                                                                                           |                                                                                      |
| $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$                                      |                                                                                      |
| No Change                                                                                         |                                                                                      |
| Words                                                                                             | Model                                                                                |
| A dilation with a scale factor of $k$ will be an image the same size as the original if $k = 1$ . |  |
| Symbols                                                                                           |                                                                                      |
| $(x, y) \rightarrow (1x, 1y)$                                                                     |                                                                                      |

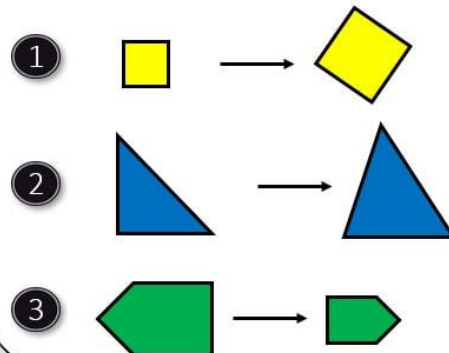
## Congruent Figures

Same size and same shape; shapes can be shifted, rotated, or flipped



## Not Congruent

Figures are not same size and/or figures are not same shape

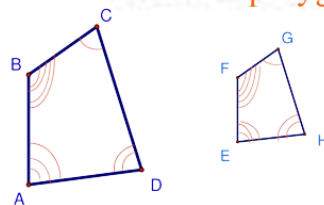


**Similar figures = polygons of same shape, different size**

Shapes that are scaled by a factor.

| If the scale factor of the dilation is ... | then the dilated figure is ... |
|--------------------------------------------|--------------------------------|
| between 0 and 1                            | smaller than the original      |
| equal to 1                                 | the same size as the original  |
| greater than 1                             | larger than the original       |

Similar polygons



$$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE}$$