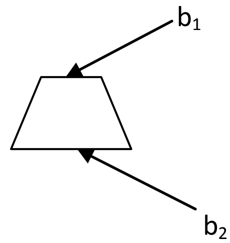
# *Formula Key*



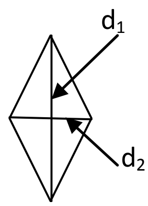

base b or ($b_1$ / $b_2$ for a *trapezoid*)

height h

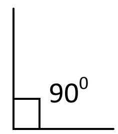
Area A

Perimeter P

diagonal d ($d_1$ / $d_2$ for a *kite*)




Perpendicular two lines form a $90^0$ angle.



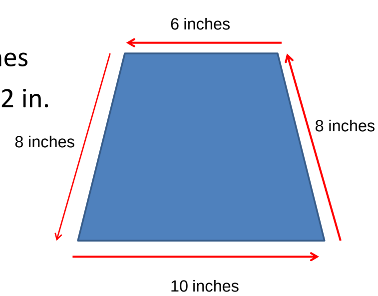

Perimeter P = total of all sides (side + side + side + side…)

## Perimeter

To find the perimeter of any shape **add** all the **side <u>lengths</u>** together.

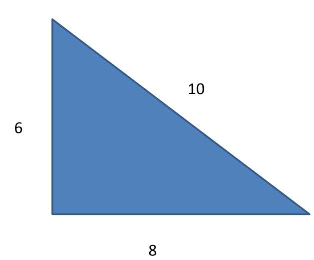
8+10+8+6=32 inches

The perimeter is 32 in.




## Pythagorean Theorem

$$A^2 + B^2 = C^2$$




$6^2 + 8^2 = 10^2$

36 + 84 = 100

$C^2 = 100$

$C = \sqrt{100}$

C= 10

Area of a triangle $A = \frac{1}{2} \times b \times h$ or $\frac{1}{2}bh$ or $\frac{bh}{2}$

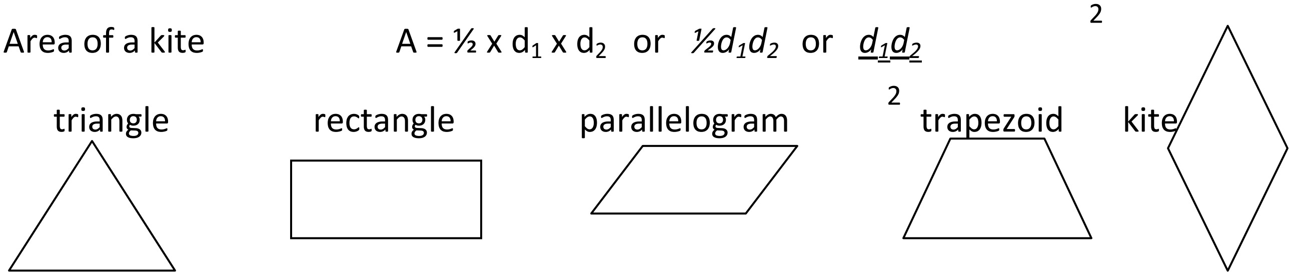
Area of a rectangle $A = b \times h$ or $bh$

Area of a parallelogram $A = b \times h$ or $bh$ *(Same as a rectangle)*

Area of a trapezoid $A = \frac{1}{2} \times (b_1 + b_2) \times h$ or $\frac{1}{2}(b_1 + b_2)h$ or $\frac{(b_1 + b_2)h}{2}$

Area of a kite $A = \frac{1}{2} \times d_1 \times d_2$ or $\frac{1}{2}d_1d_2$ or $\frac{d_1d_2}{2}$

triangle rectangle parallelogram trapezoid kite



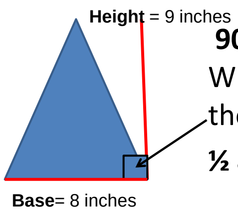
# Area of a Triangle

Formula: ½ x base x height *or* ½ b x h *or* **½ bh**

The **base** is measured by length

The **height** is measured by length

The **height** and the **base** must form a **$90^0$ angle**.




**$90^0$ angle is a right angle.**

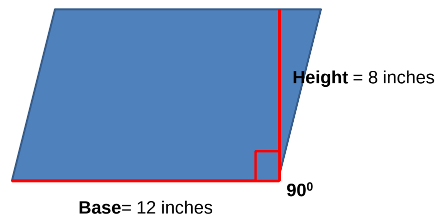
When two lines form a **$90^0$ angle** they are ***perpendicular***.

**½ 8x9 = 36  Area = 36 in.$^2$**

# Area of a *Parallelogram*

Formula: base x height or b x h or **bh**

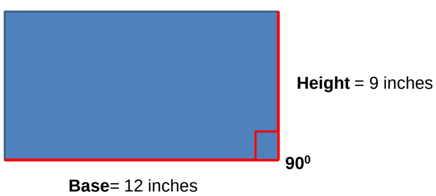
**12 x 8 = 96  Area = <u>96 in.$^2$</u>**




***Use the same formula as a rectangle**

# *Area of a Rectangle*

Formula: base x height *or* b x h *or* **bh**




The **base** and the **height** must be **perpendicular.**

***Perpendicular***= two lines form a right angle**. ($90^0$)**

**Base x height = Area  12 x 9 = 108  Area = 108 in.$^2$**

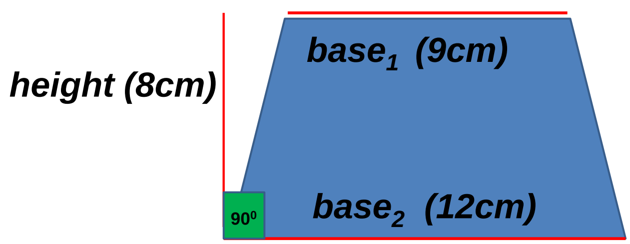
# Area of a Trapezoid

Formula: ***Area = ½ (base$_1$ + base$_2$) x height***

***$A = ½ ( b_1 + b_2) x h$***

***A = ½ (9+ 12) x 8***

***A = 84 cm$^2$***




# Area of *Kites*

Formula: Area = ½ diagonal$_1$ x diagonal$_2$

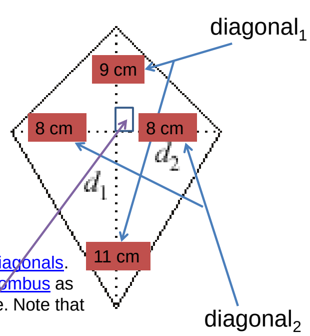
$d_1$= (9cm + 11cm)

$d_2$= (8cm + 8cm)

A = ½ x $d_1$ x $d_2$

A = ½ x 20 x 16

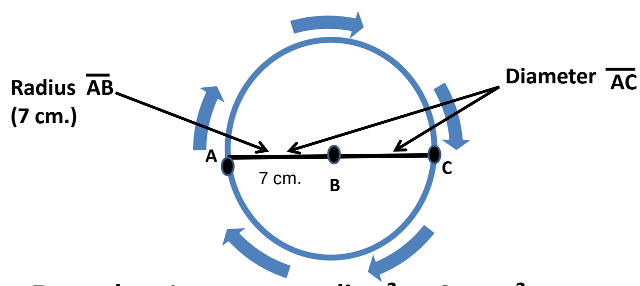
A = 160 cm$^2$




The area of a kite is half the product of the diagonals. Note: This formula works for the area of a rhombus as well, since a rhombus is a special kind of kite. Note that the diagonals of a kite are perpendicular.

# *Area of a Circle Using Radius*

***Definition:*** the inside of circle




***Formulas***: Area = π *x* ***radius*** $^2$ or **A = πr$^2$**

Area = π *x* (7 cm.$^2$) or **A = π(7$^2$)**

Area = π *x 49 A = 49* π  A= 154 cm.

# ***Formula Key for Circles***

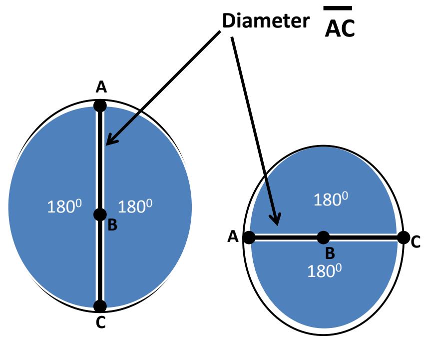
**Diameter is 2 x radius. (2r)**

It is ***a line segment*** that divides a circle in half.

Each half is called a ***semi-circle***.

The diameter crosses through the ***center point***.

## ***Diameter***

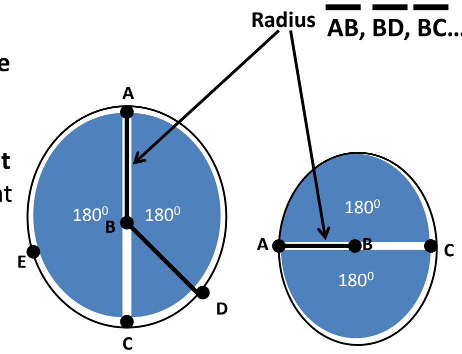



## ***Radius***

The **radius is ½ the diameter. (½ d)**

It is a **line segment** with **one end** point on the **center** and **one end** point on the **edge** of the circle.

A circle can have many radii.

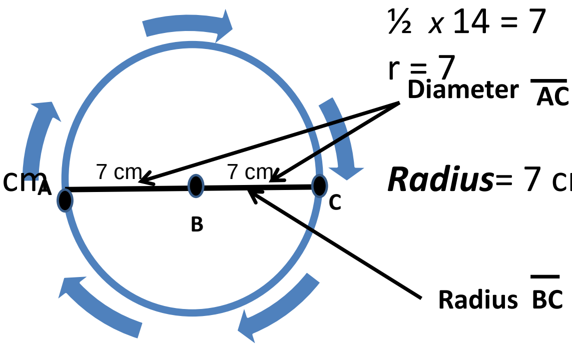



## ***Equations to find Diameter & Radius***

***Radius*** = 7cm.
2 x radius = diameter
2 *x* 7 = d
d =14

***Diameter***= 14 cm
½ x diameter=radius
½ *x* 14 = 7
r = 7

***Diameter***= 14 cm

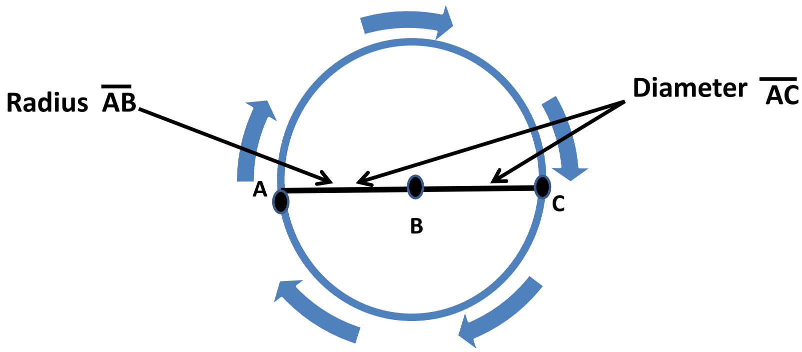



***Radius***= 7 cm

***Formulas***: ***diameter*** = 2 *x* radius or 2r
***radius*** = ½ *x* diameter or ½d

# *Circumference*

***Definition:*** The distance around the whole circle

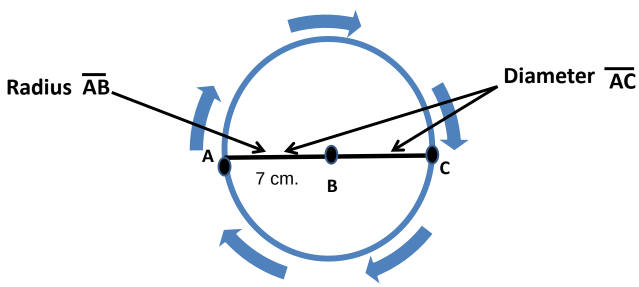



***Formulas***: Circumference = π *x* ***diameter*** or C= πd

Circumference = 2 *x* π *x* ***radius*** or C= 2πr

## *Circumference using diameter:*

***Diameter***= 14 cm. ***C = πd*** or ***C = 14π*** ***C = 44 cm.***

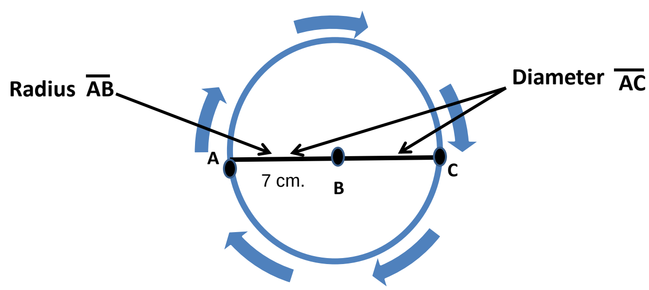



***Formulas***: Circumference = π *x* ***diameter*** or C= πd

Circumference = 2 *x* π *x* ***radius*** or C= 2πr

## *Circumference using radius:*

***Radius*** = 7cm. ***C = 2 x π x r***, ***C = 2πr*** , ***C = 14π***, ***C = 44 cm.***

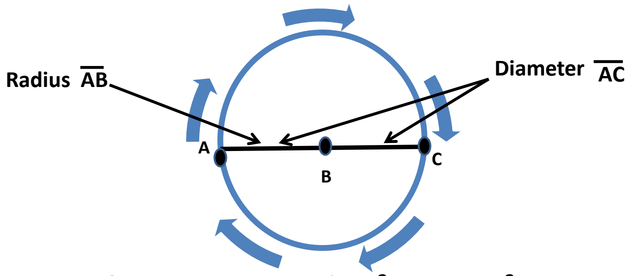



***Formulas***: Circumference = π *x* ***diameter*** or ***C= πd***

Circumference = 2 *x* π *x* ***radius*** or ***C= 2πr***

## *Area of a Circle*

***Definition:*** the inside of circle

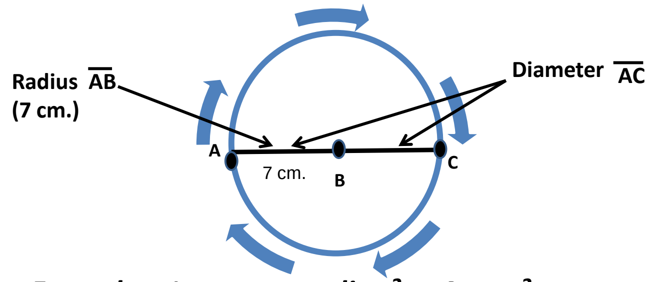



***Formulas***: Area = π *x* ***radius*** $^2$ or **A = π$r^2$**

Area = π *x* (½ ***diameter)*** $^2$ or **A = π(½d)$^2$**

## *Area of a Circle Using Radius*

***Definition:*** the inside of circle



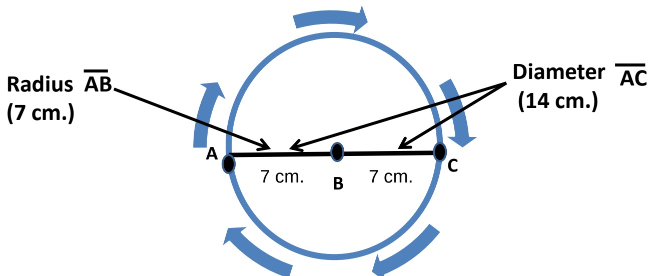

***Formulas***: Area = π *x* ***radius*** $^2$ or **A = π$r^2$**

Area = π *x* (7 cm.$^2$) or **A = π($7^2$)**

Area = π *x 49  A = 49* π  A= 154 cm.

## *Area of a Circle Using Diameter*

***Definition:*** the inside of circle




***Formulas***: Area = π *x* (½ ***diameter)*** $^2$ or **A = π(½d)$^2$**

Area = π *x* (½14 cm.$^2$) or **A = π($7^2$)**

Area = π *x 49  A = 49* π  A= 154 cm.

## *Major and Minor Arcs*

**The Symbol is** $\frown$

**The minor arc is less than $180^0$**

**The major arc is more than $180^0$**

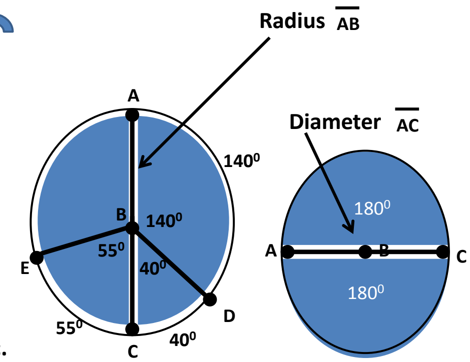
**$\overset{\frown}{AD}$ is a minor arc**

**$\overset{\frown}{AD}$ = $140^0$**

**$\overset{\frown}{ADE}$ is a major arc.**

**$\overset{\frown}{ADE}$ = 140 + 40+ 55**

**$\overset{\frown}{ADE}$ = $235^0$**



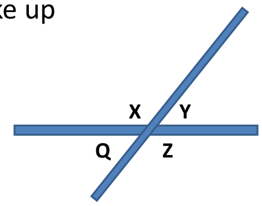

***What does $\overset{\frown}{AE}$ equal? $360^0 – 235^0 = 145^0$***

•**Note- The major arc will have <u>three</u> vertices to show direction.**

# Interior Angles of shapes & Lines

## Straight Lines

The angles that make up a line ***always*** equal 180 degrees.

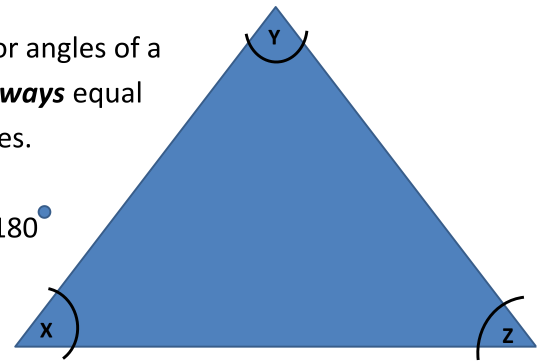



<X+ <Y = 180°
<Y+ <Z= 180°
<Z+ <Q= 180°
<Q+ <X= 180°

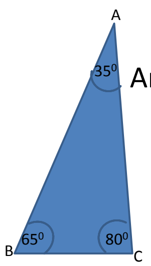
## Triangles

The interior angles of a triangle ***always*** equal ***180*** degrees.

X+ Y+ Z = 180°




## Angles




The symbol for an angle is **<**
Angles are measured in ***degrees***.
The symbol for degrees is _ **⁰**

Examples:
(Angle A) <A = $35^0$
(Angle B) <B = $65^0$
(Angle C) <C = $80^0$

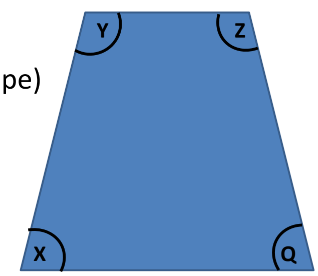
The sum (total) of interior (inside) angles of a **triangle** is always **$180^0$**

35 + 65 + 80 = 180

## Quadrilateral

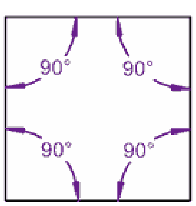
The interior angles of a Quadrilateral (4 sided shape) ***always*** equal ***360*** degrees.

X+ Y+ Z + Q = 360°

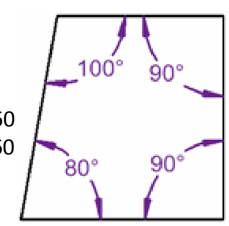



## **Quadrilaterals (Squares, etc)**

(A Quadrilateral has 4 straight sides)



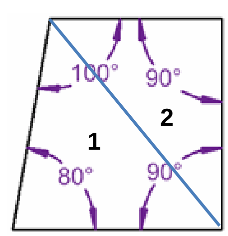

***Formula:***
180 (n-2)= 360
180 (4-2)= 360
180(2)= 360




**90° + 90° + 90° + 90° = 360°**
A Square adds up to 360°

**80° + 100° + 90° + 90° = 360°**
Let's tilt a line by 10° ... still adds up to 360°!

## Divide the shape into triangles :




A quadrilateral can be divided into two triangles. Each triangle has 3 angles that add up to $180^0$ . 2 X $180^0$= $360^0$.