

Measures: Perimeter & Area
Mathematics and Millennials – 6th

Criteria for Geometry

Closed Polygons have all sides **connected**.
Open Polygons have **disconnected** sides.

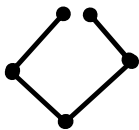
Convex Polygon has sides going **outward**.
Concave Polygon has side(s) going **inward**.

Congruent Polygons are **exactly same** shape.
Similar Polygons are **proportional** shapes.

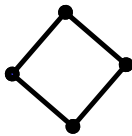
Open & Closed

Open * Geometry **No**

Closed * Geometry **Yes**



Why?

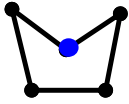


Open violates Definition of Polygons!

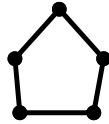
Can you measure interior angles of Open shape?

Convex and Concave

Concave * Geometry **No** Convex * Geometry **Yes**



Why?

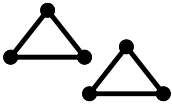


Concave violates Definition of Polygons!

Interior angles must be $0^\circ < A < 180^\circ$ degrees.

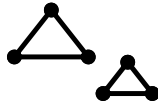
Congruent and Similar

Congruency



Equivalent Shapes

Similarity



Proportional Shapes

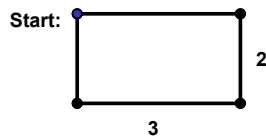
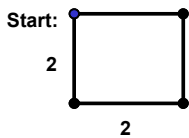
Both properties are accepted by Geometry!

Perimeter: D & E

Perimeter is a measure of the **distance around!**

A 2 x 2 Square has a **boundary** of 8 units.

A 2 x 3 Rectangle has a **boundary** of 12 units.

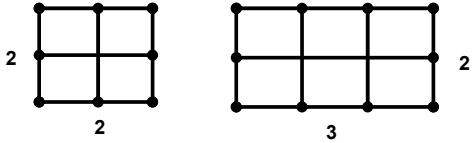


Area: D & E

Area is a measure of the surface contained within.

A 2 x 2 Square contains 4 square units.

A 2 x 3 Rectangle contains 6 square units.

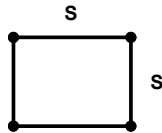


Square: P & A

Area of a Square: What is Perimeter? ____

$$\text{Area} = S \times S \text{ or } S^2$$

If $S = 3$ & $S = 3$ then $A =$ ____

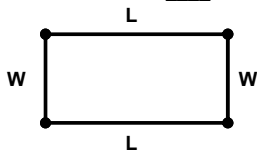


Rectangle: P & A

Area of a Rectangle: What is Perimeter? ____

$$\text{Area} = L \times W$$

If $L = 5$ & $W = 3$ then $A =$ ____

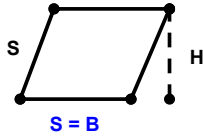


Rhombus: P & A

Area of a Rhombus: What is the Perimeter? ____

$$\text{Area} = B \times H$$

If $B = 5$ & $H = 4$ then $A =$ ____

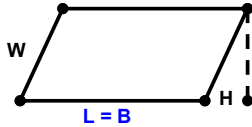


Rhomboid: P & A

Area of a Rhomboid: If $W = 6$ then Perimeter = ____

$$\text{Area} = B \times H$$

If $B = 7$ & $H = 5$ then $A =$ ____

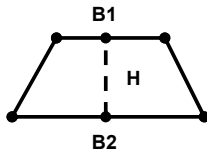


Trapezoid: P & A

Area of a Trapezoid If Sides=5 then Perimeter = ____

$$\text{Area} = \frac{1}{2} (B_1 + B_2) \times H$$

If $B_1=5$, $B_2=7$, $H=4$
then $A =$ ____



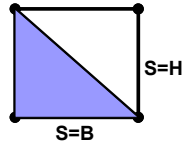
Area of Triangle

Triangle = $1/2$ of a Square

Basic (6) Triangles?

Area of Sq: = $S \times S$ or $S=B$ & $S=H$

Thus: Area of Triangle = $1/2 \times B \times H$



Triangle: P & A - 1

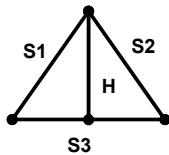
Equilateral Triangle:

Perimeter = $S1 + S2 + S3$

If $S1=6$, $S2=6$, $S3=6$ then $P = \underline{\quad}$

Area = $1/2 \times B \times H$

If $B=6$ & $H=5$ then $A = \underline{\quad}$



Perimeter of a Triangle

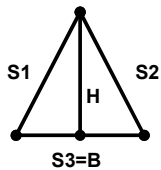
Isosceles Triangle

Perimeter = $S1 + S2 + S3$

If $S1=6$, $S2=6$, $S3=4$ then $P = \underline{\quad}$

Area = $1/2 \times B \times H$

If $B=4$ & $H=5$ then Area = $\underline{\quad}$



Perimeter of a Triangle

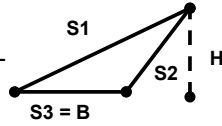
Scalene Triangle

Perimeter = $S1 + S2 + S3$

If $S1=9, S2=6, S3=4$ then $P = \underline{\hspace{2cm}}$

Area = $1/2 \times B \times H$

If $B = 4, H = 5$ then Area = $\underline{\hspace{2cm}}$



Investigation: Pi

Pi (π) can be estimated from a measured investigation between C & D of a circle! Pi (π) ~ 3.14?

Simple Inductive Experiment:

Create a few circles of various sizes then measure Diameters (D) of each circle. Carefully, lay a string around each circumference (C) then measure length of string. Create table for D, C, C/D and collect data! Compare C/D in all circles! Is C/D an estimate for Pi?

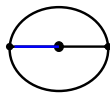
Perimeter of Circle

Perimeter (Circumference) of a Circle

$C = \pi \times D$ or $\pi \times 2 \times R$

If $R = 3$ & $D = 6$ then $C \sim 18.84$?

$R = 3$ $D = 6$



Pi (π) is not exactly 3.14 thus (~) means estimate value.

Area of a Circle

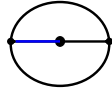
Area of a Circle

$$\text{Area} = \pi R^2 \text{ or } \pi R \times R$$

If $R=3$ & $D=6$ then $A \sim 28.26$?

π (π) is not exactly 3.14 thus (-) means estimate value.

$$R = 3 \quad D = 6$$



Conclusion
