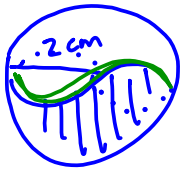
Homework Questions

11.2A #12

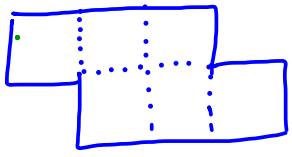
$L = \frac{1}{2}(2\pi r) = \pi$ units

11.2B #12



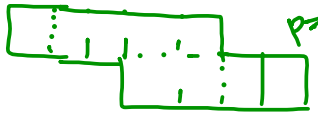
$L = \pi d = \pi(2) = 2\pi$ cm

11.2B #17

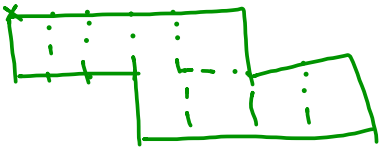


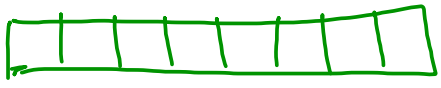
$P = 12$ units

(a) want $P = 18$ units



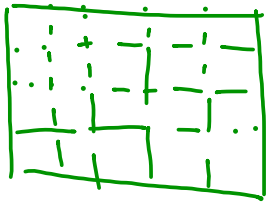
(b)





8 squares

(c)

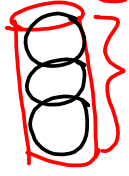


20 squares

mc #7)

no

mc #8)



$C = \pi d$

$h = 3d$

d = diameter of ball

$\pi > 3$

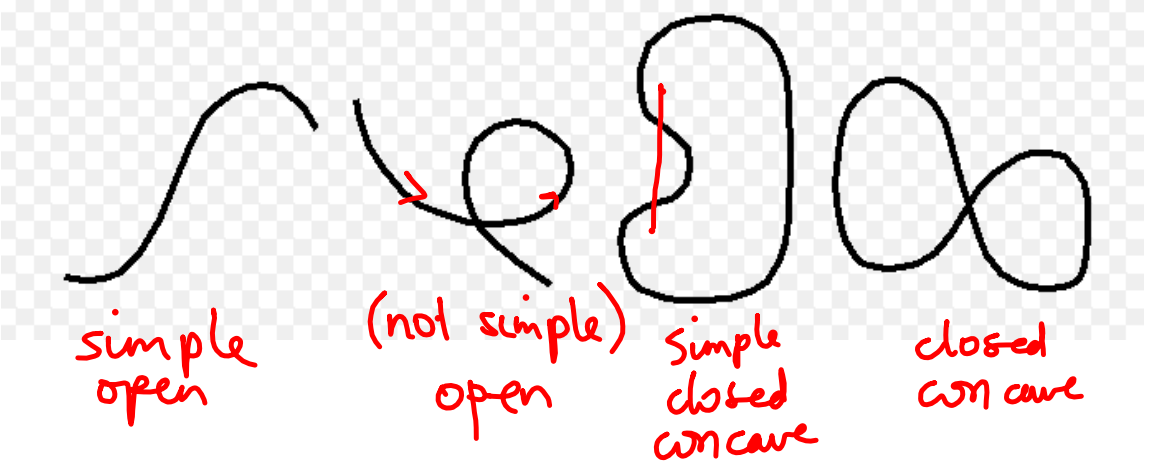
$\Rightarrow C > h$

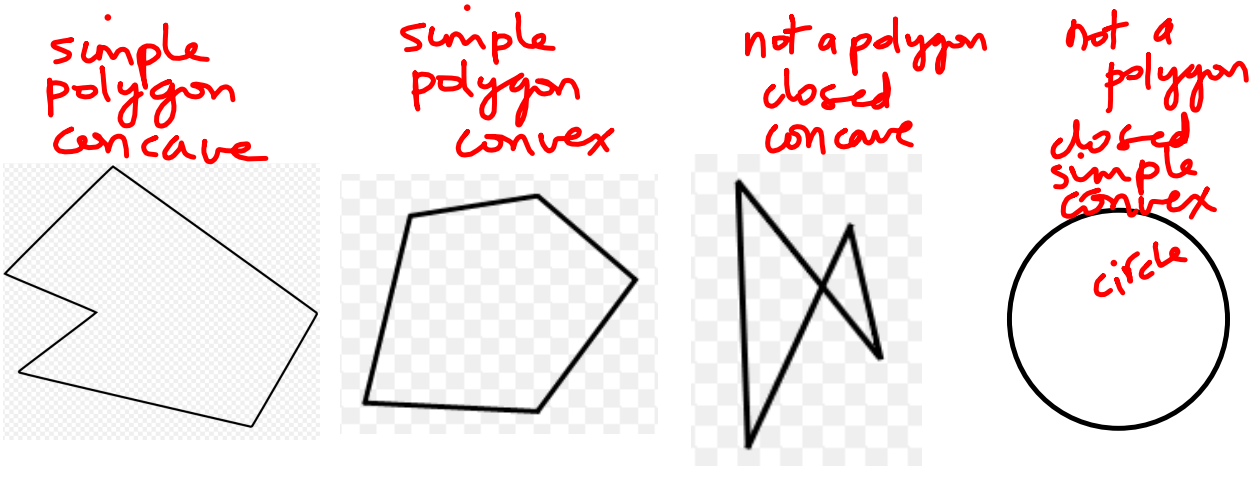
11.2A #3) $100 \text{ in} \left(\frac{1 \text{ ft}}{12 \text{ in}}\right)\left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)$ (to yds)

$= \frac{100}{36} \text{ yd} = 2\frac{7}{9} \text{ yd}$

For each shape, label with these words:

polygon, simple, closed, open, convex, concave

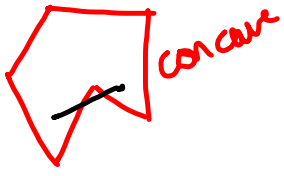




Congruent--> Two shapes are congruent if they are the same size and shape. That is, the first shape can be picked up and placed on top of the other shape and it will fit exactly (with no twisting, breaking, stretching, bending, etc.)

Similar--> Two shapes are similar if they are the same shape, but not necessarily the same size; one of the shapes is a scaled version of the other shape.

Polygon--> A many-sided, closed, 2-d shape made up of line segments for sides that meet at vertices.

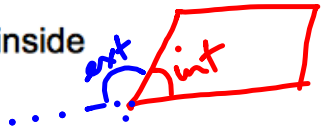


Convex--> A shape is convex if *every* line segment, formed by connecting *any* two points inside the shape, is wholly contained in the shape.

Concave--> A shape is concave if it is not convex.

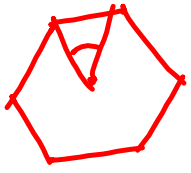
Regular--> A polygon is regular if all of its sides and all of its interior angles are congruent.

Interior Angle--> In a convex polygon, it's the inside angle formed by two adjacent sides.



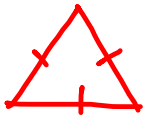
Exterior Angle--> In a convex polygon, it's the angle formed by the side of the polygon and the extended line from the adjacent side (for every interior angle, there are two exterior angles).

Central Angle--> For a regular polygon, it's the angle formed by connecting a vertex to the center of the polygon and then to the consecutive vertex.



Triangle--> A 3-sided (straight sides), closed, two-dimensional shape.

Isosceles Triangle--> A triangle with at least two sides that are of equal length. (equilateral Δ is an isosceles Δ)



Equilateral Triangle--> A triangle with all three sides of equal length.

Scalene Triangle--> A triangle with all three sides of different length.

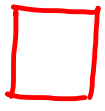
Obtuse Triangle--> A triangle with one obtuse angle.

Right Triangle--> A triangle with one right angle.

Acute Triangle--> A triangle with all acute angles.

Quadrilateral--> A 4-sided (straight sides), closed, two-dimensional shape.

Square--> A quadrilateral with four congruent sides and four right angles. (regular quadrilateral)

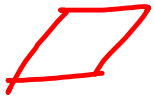


Rectangle--> A quadrilateral with four right angles.

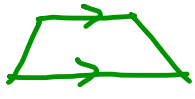
Parallelogram--> A quadrilateral with two pairs of parallel sides.

Kite--> A convex quadrilateral with two distinct pairs of adjacent congruent sides.

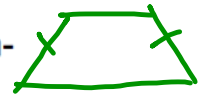
Rhombus--> A quadrilateral with four congruent sides.



Trapezoid--> A quadrilateral with exactly one pair of parallel sides.



Isosceles Trapezoid--> A trapezoid whose non-parallel sides are congruent.



Symmetry

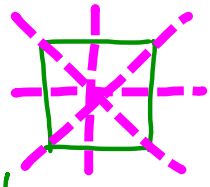
A figure has *symmetry* if there is a rigid motion that carries it onto itself. If the rigid motion is a reflection, the symmetry is called *reflection symmetry*. If the rigid motion is a rotation, the symmetry is *rotational symmetry*.

Ex 1 For these shapes, draw and list the symmetries.

parallelogram

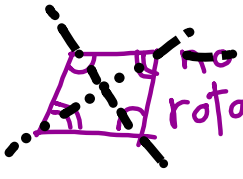
· no reflection sym.
· rotation sym 180°

square



· reflectn sym.
· rotation sym. 90°

rhombus

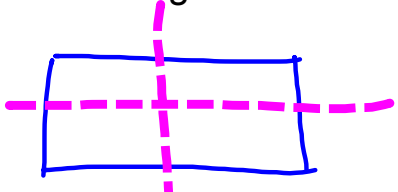


no reflection
rotation @ 180°

isosceles triangle

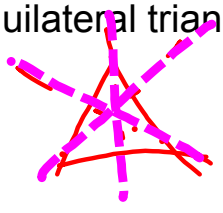
reflection
no rotation

rectangle



reflectn sym
rotatn 180°

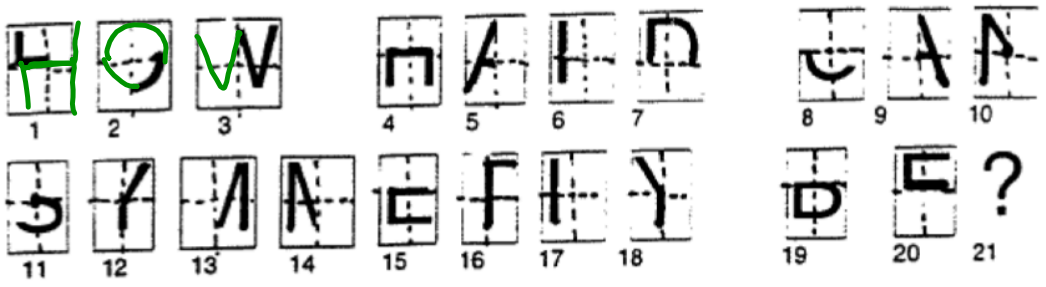
equilateral triangle



~~no~~ 120° rotation
3-lines Symmetry

isosceles trapezoid

vertical Reflection
no rotation



Ex 2 In the arrangement above, give vertical symmetry to # 1, 2, 3, 5, 9, 12, 13, 14, 16, 18.

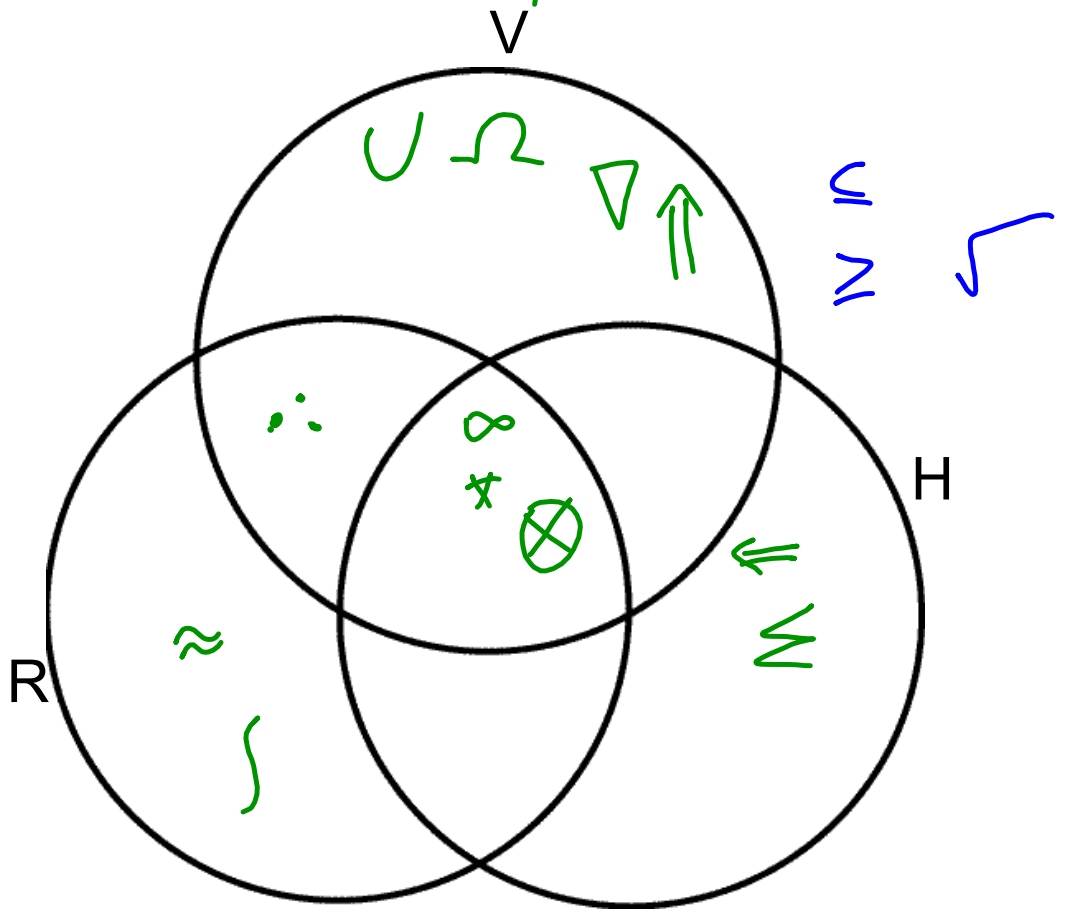
Give point (180 degrees rotational) symmetry to #10, 11.

Give horizontal symmetry to #1, 2, 4, 7, 8, 15, 19, 20.

Ex 3 Find the symmetry in these math symbols (below). Group them by vertical (V), horizontal (H), and rotational symmetry (R). Put that information into the Venn Diagram.

$$\Leftarrow \cup \infty \Omega \approx \sum \int \nabla \subseteq \otimes \geq \Uparrow \sqrt{\ } * \therefore$$

H V V H R V R H R V V H R V H R V R

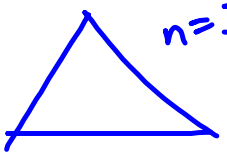


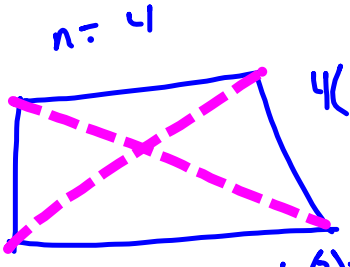
Ex 4 Find a formula to represent the number of diagonals in an n-gon (a polygon with n sides).

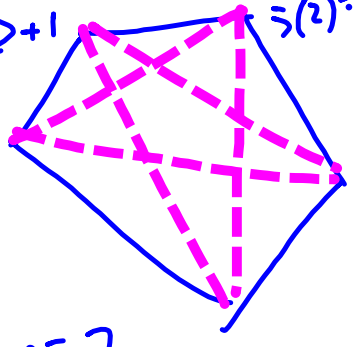
Let n = number of sides in the polygon

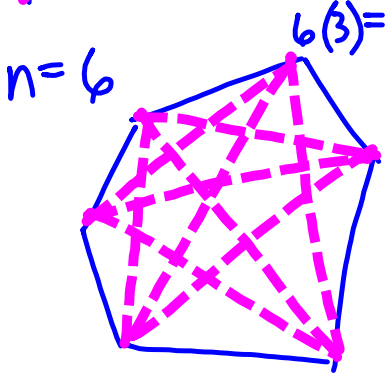
d = number of diagonals

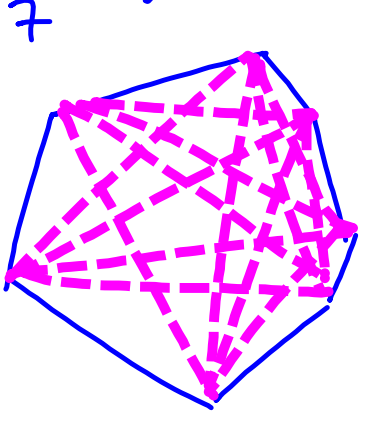
n	d	
3	0	+2
4	2	+3
5	5	+4
6	9	
7	14	
⋮	⋮	
n	? $\frac{n(n-3)}{2}$	











Ex 5 A polygon can be divided up into non-overlapping triangles. Find a formula for the smallest number of triangles we can use to cover a polygon (n-gon).