Geometry Jeopardy

Polygons

10 points-- What ~~does~~ is the formula 180(n-2) used to determine?

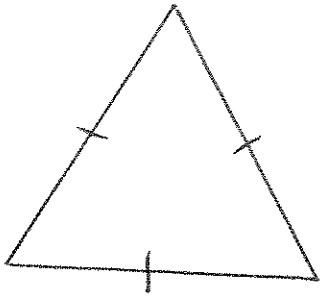
vertex angle sum for any polygon with n sides

20 points-- Give two adjectives for each of these triangles:

(a)

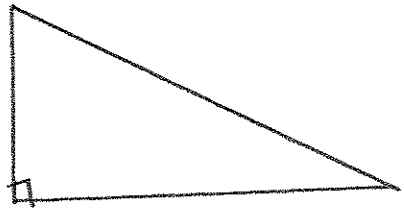
isosceles
obtuse

(b)



equilateral
acute

(c)



right
scalene

30 points-- Find the central angle for an 11-sided polygon.

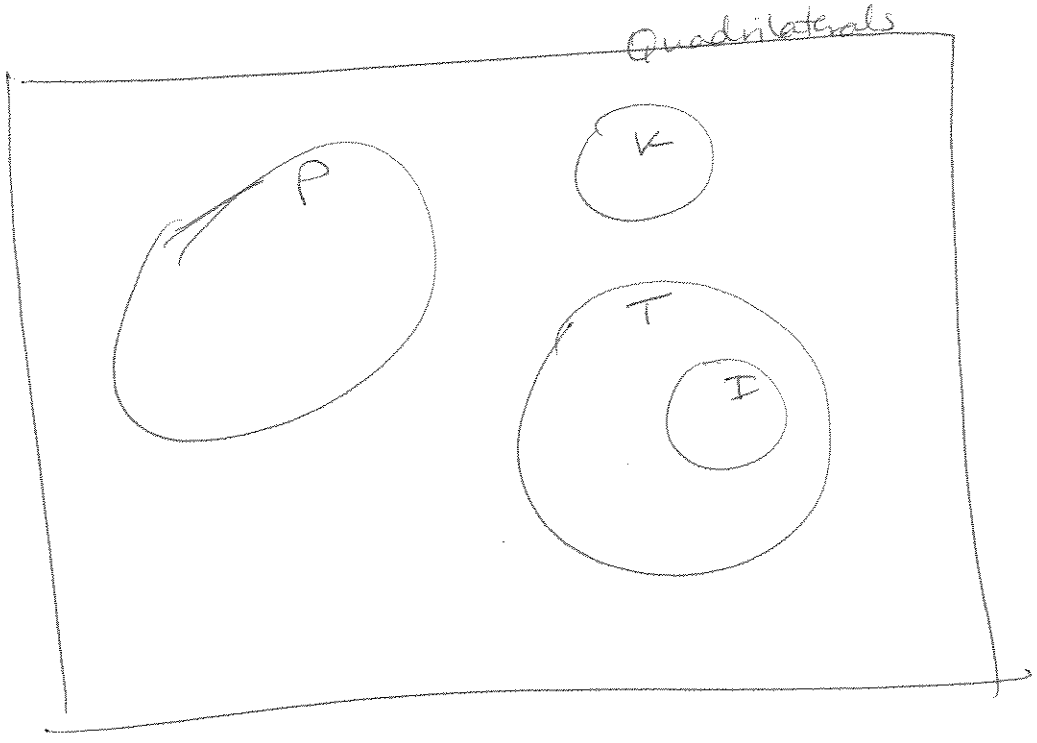
$\frac{360}{11} = 32\frac{8}{11}^{\circ}$

Polygons (continued)

40 points-- Give the formula used to calculate the interior angle measure for a regular n-gon.

$$\frac{180(n-2)}{n}$$

50 points-- Draw and label a Venn Diagram illustrating the relationship between T (trapezoids), I (isosceles trapezoids), P (parallelograms), and K (kites).



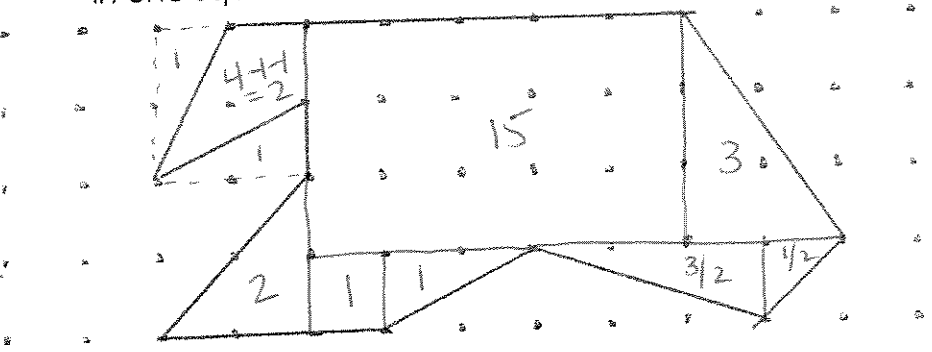
Area/Perimeter

10 points-- Find the area of the following triangle. (Draw height.)

$h = 3\text{ cm}$

$A = \frac{1}{2}(8)(3) = 12\text{ cm}^2$

20 points-- Find the area of the following shape given that one grid square in one square unit of area.

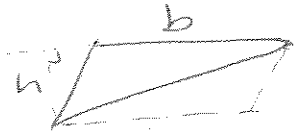


$A = 2 + 15 + 3 + 2 + 1 + 1 + \frac{3}{2} + \frac{1}{2}$

$= 26\text{ units}^2$

30 points-- Give a mathematically convincing argument for the formula for the area of a triangle.

Any triangle can be considered as half of a parallelogram. So the area of a triangle is half the area of the corresponding parallelogram.



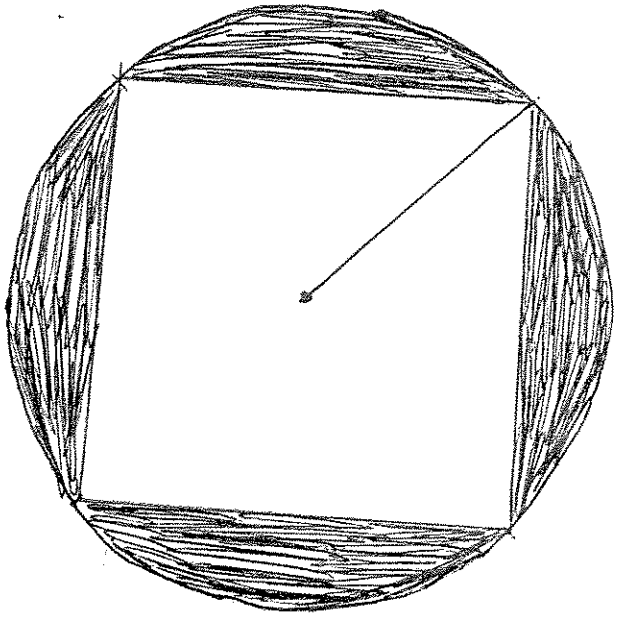
$\Rightarrow A_{\triangle} = \frac{1}{2}bh$

Area/Perimeter (continued)

40 points-- Find the area of the shaded region in the following shape, given that the radius of the circle is 5 inches.

$A = 25\pi - 50$

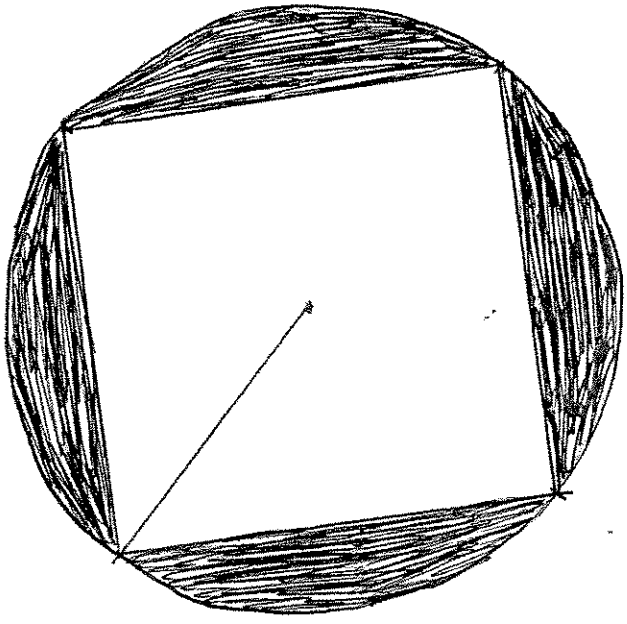
$\approx 28.54 \text{ in}^2$



50 points-- Find the perimeter of the shaded region in the following shape, given that the side of the square is 3 meters.

$P = 12 + 3\sqrt{2}\pi$

$\approx 25.33 \text{ m}$



Symmetry

10 points-- Which two types of quadrilaterals have horizontal, vertical and rotational symmetry?

square, rectangle

20 points-- What symmetry does a regular pentagon have?

reflection and rotational both

30 points-- What kind of symmetry does the word

MOM

have? vertical reflection

40 points-- Which type of triangle always has only reflection symmetry?

isosceles triangle

50 points-- List the one type of quadrilateral that has no symmetry.

trapezoid

Hodge Podge

10 points-- What is the definition of pi?

$\pi = \frac{C}{d}$ where C = circumference of a circle and d = diameter of that circle

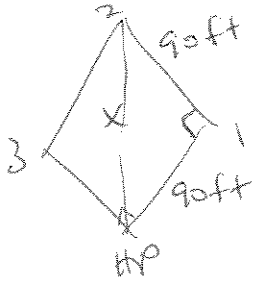
20 points-- Which polygons tessellate any plane?

quadrilaterals and triangles

30 points-- Which regular polygons tessellate any plane?

hexagon, square, triangle

40 points-- On a baseball diamond the bases are 90 ft apart. What is the distance from home plate to second base in a straight line?



$90^2 + 90^2 = x^2$

$2(8100) = x^2$

$\sqrt{2(8100)} = x$

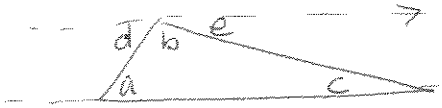
$x = 90\sqrt{2} \approx$ 127.3 ft

50 points-- Give the definition of convex.

A closed shape is convex if every line segment connecting any two interior points is wholly contained inside the shape

Angles

10 points-- What is the sum of the interior angles of a triangle? Give a brief, convincing argument.



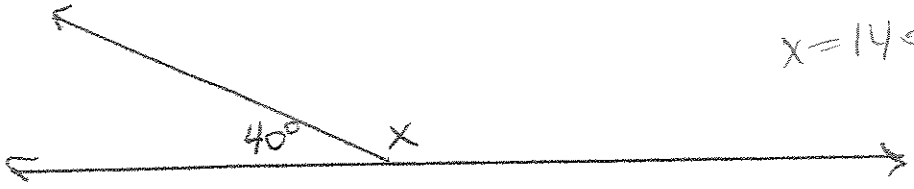
$a = d$ (alt. int. $\angle$s)

$c = e$ (")

$d + b + e = 180$ (straight angle)

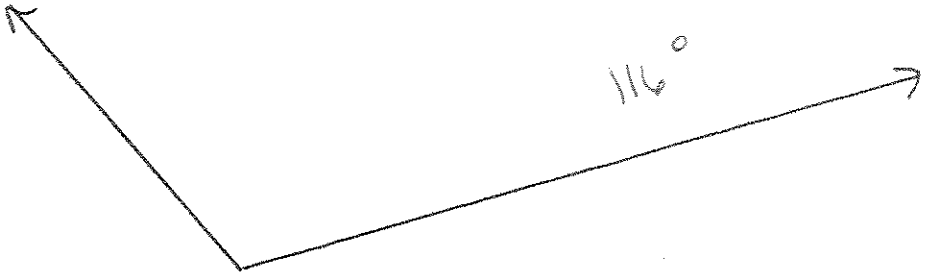
$a + b + c = 180$ (substitution)

20 points-- Find the value of x in the following diagram.



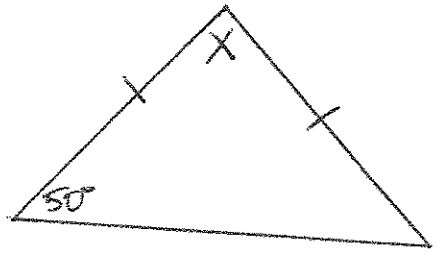
$x = 140°$

30 points-- Measure this angle with a protractor.



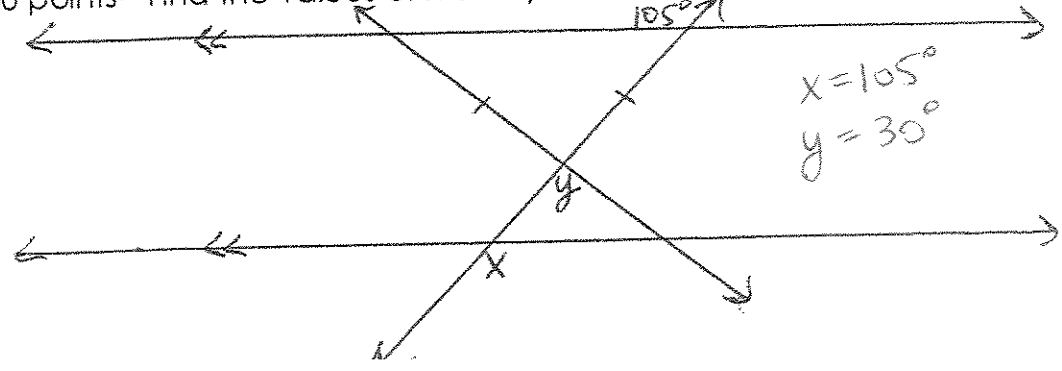
116°

40 points-- Find the value of x in the following triangle.



$x = 80°$

50 points-- Find the values of x and y in the following diagram.



$x = 105°$

$y = 30°$

Conversions

10 points-- 5 cm = ?? dm

0.5 dm

20 points-- 3 sq. ft. = ?? sq. in.

432 in^2

30 points-- 45 mi/hr = ?? m/sec

20,1168 $\frac{m}{sec}$

40 points-- If 2 gums = 1 jack and 3 jacks = 1 marble, then 7 gums is how many marbles?

$\frac{7}{6}$ marbles

50 points-- 3.6 liters = ?? tsp.

≈730.38 tsp

Bonus

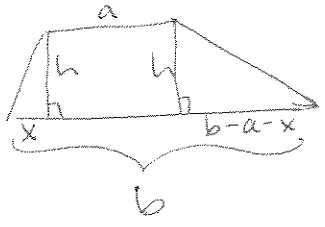
10 points-- The units "squeaks squared" would measure what kind of measurement?

area

20 points-- List the two types of quadrilaterals that have only reflection symmetry.

kite, isosceles trapezoid

30 points-- Give a convincing argument for the formula for the area of a trapezoid.



$A = ah + \frac{1}{2}xh + \frac{1}{2}(b-a-x)h$

$= ah + \frac{1}{2}xh + \frac{1}{2}bh - \frac{1}{2}ah - \frac{1}{2}xh$

$= \frac{1}{2}bh + \frac{1}{2}ah = \frac{1}{2}(a+b)h$

40 points-- Demonstrate a proof of the Pythagorean Theorem.

(many correct proofs ... we did two in class)