

 Math 1030 #17b 

Fundamentals of Geometry

 Plane Geometry 

parallelogram



rectangle



pentagon



triangle



pentagon



POLYGONS

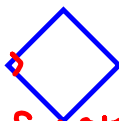
polygon : many-sided, closed,
2-d shape with
straight sides (ie. no
curvy sides)

regular polygon : a polygon with all congruent
legs and interior angles

regular
pentagon

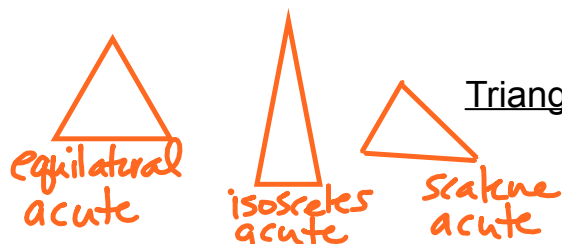


square



regular
hexagon





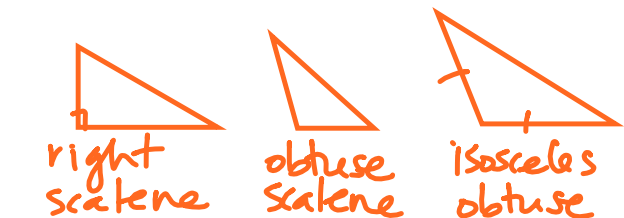
Triangles

equilateral
acute

isosceles
acute

scalene
acute

Side length adjectives



right
scalene

obtuse
scalene

isosceles
obtuse

Angle adjectives

equilateral: all
sides are same
length

obtuse: one of the angles
is obtuse

isosceles: 2 of sides
are same length w/
one side a different
length

acute: all 3 angles are
acute

scalene: all 3 sides
are different
lengths

right: one angle is 90°

Perimeter and Area of Polygons

Perimeter: (1-d measurement) measures length
around the outside of the polygon

ex units: in, m, cm, ft, yd

Area: (2-d measurement) measures 2d space
inside polygon

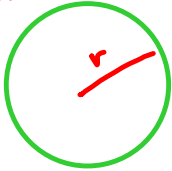
ex units: in², m², cm², ft², yd²

Formulas

Perimeter

Area

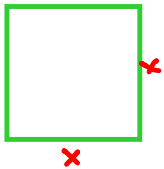
circle



$$P = 2\pi r$$

$$A = \pi r^2$$

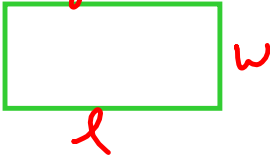
square



$$P = 4x$$

$$A = x^2$$

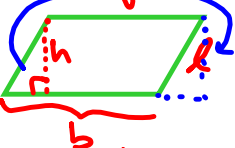
rectangle



$$P = 2l + 2w$$

$$A = lw$$

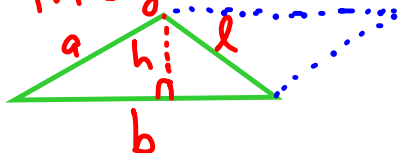
parallelogram



$$P = 2b + 2l$$

$$A = bh$$

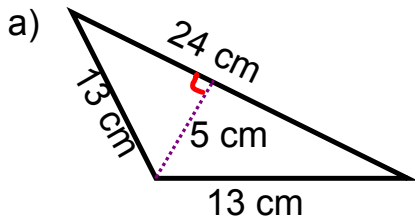
triangle



$$P = b + a + l$$

$$A = \frac{1}{2}bh$$

EX 1: Determine the perimeter and area of each of these.

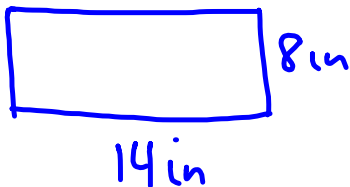


$$b = 24 \text{ cm}, h = 5 \text{ cm}$$

$$A = \frac{1}{2}bh = \frac{1}{2}(24)(5) = 60 \text{ cm}^2$$

$$P = 13 + 24 + 13 = 50 \text{ cm}$$

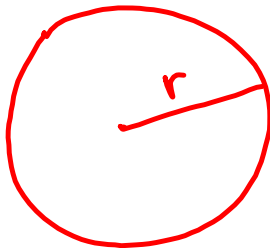
b) An envelope with length of 8 inches and width of 14 inches.



$$P = 2(14) + 2(8) = 44 \text{ in}$$

$$A = 8(14) = 112 \text{ in}^2$$

c) A round stadium with diameter of 1.5 dm.



$$d = 1.5 \text{ dm} \Rightarrow r = \frac{1}{2}(1.5 \text{ dm}) = 0.75 \text{ dm}$$

$$P = 2\pi r = 2\pi(0.75) \text{ dm}$$

$$= 1.5\pi \text{ dm}$$

$$\approx 4.71 \text{ dm}$$

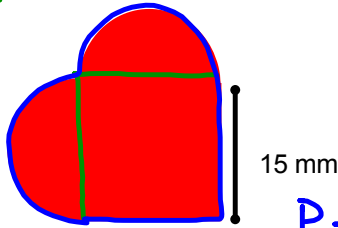
$$A = \pi r^2 = \pi(0.75)^2 = 0.5625\pi \text{ dm}^2$$

$$\approx 1.767 \text{ dm}^2$$

EX 2: Determine the area and perimeter of these shapes.

a) Assume this is made up of a square and a circle (cut in half)

$$r = \frac{1}{2}(15 \text{ mm}) \\ = 7.5 \text{ mm}$$

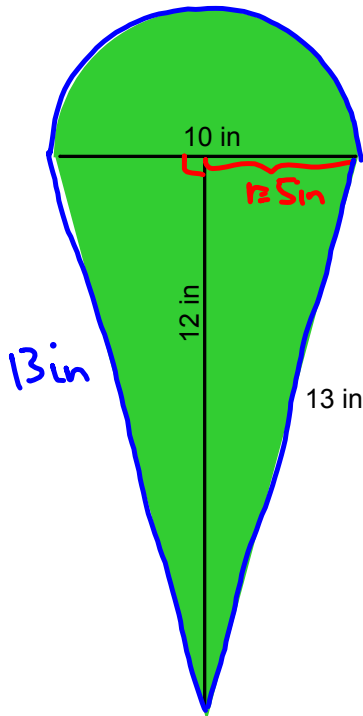


$$A = \text{area of square} + \text{area of circle}$$

$$= (15 \text{ mm})^2 + \pi (7.5 \text{ mm})^2 \\ = 225 + 56.25\pi \text{ (mm}^2) \approx 401.7 \text{ mm}^2$$

$$P = \text{perimeter of circle} + \text{perimeter of half the square} \\ = 2\pi (7.5 \text{ mm}) + 2(15 \text{ mm}) \approx 77.1 \text{ mm}$$

b) This is a semicircle on an isosceles triangle.



$$A = \text{area of half circle} + \text{area of isosceles triangle}$$

$$= \frac{1}{2}(\pi 5^2) + \frac{1}{2}(10 \cdot 12) \text{ in}^2 \\ = 12.5\pi + 60 \text{ in}^2 \\ \approx 99.3 \text{ in}^2$$

$$P = \text{perimeter of half circle} + \text{perimeter of 2 sides of } \Delta \\ = \frac{1}{2}(2\pi(5)) + 2(13) \text{ in} \\ = 5\pi + 26 \text{ in} \approx 41.7 \text{ in}$$