

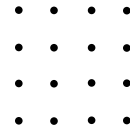
## 8<sup>th</sup> Grade Assignment – Week #13

### Group Assignment:

- *For Tuesday:* Do the following problems from **Mensuration Group Sheet #3**, in the given order, as time allows:
  - Problem #3
  - Problem #2
  - Problem #1

- *For Thursday:* Either continue work on the above (Tuesday) problems, or work on the below puzzle:

*Connect-the-Dot Triangles.* How many possible non-congruent triangles can be formed by connecting three of the dots on this four-by-four grid in order to make a triangle?



### Individual Work

- **Mensuration Practice Sheet #4:** Last week, you did some of the problems on this sheet. Now finish the rest of the problems.
- **Mensuration Practice Sheet #5:** problems #1, 3, 4b,5a

# Mensuration – Group Sheet #3

- 1) The formula for the volume of a sphere (which can be derived from Archimedes' Ratio) is:

$$V = \frac{4}{3}\pi r^3$$

The formula for the surface area of a sphere is:

$$S = 4\pi r^2$$

- a) Calculate the volume of a ball that has a 12-inch diameter.

- b) Calculate the surface area of a ball that has a 12-inch diameter.

- 2) **Heron's Formula.**

This formula allows us to calculate the area of a triangle without knowing what the height is. It is:

$$A = \sqrt{s(s-a)(s-b)(s-c)},$$

where  $a, b, c$  are the sides of the triangle, and  $S$  is the semi-perimeter (i.e., half the length of the perimeter).

**Example:** Calculate the area of a triangle that has sides of length 7m, 8m, and 9m.

**Solution:** The perimeter is 24m, so the semi-perimeter is 12m.

Putting all the numbers into the formula, we get: Area =

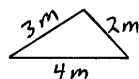
$$\sqrt{12(12-7)(12-8)(12-9)},$$

which is  $\sqrt{12 \cdot 5 \cdot 4 \cdot 3}$ , and then  $\sqrt{720}$ . Using

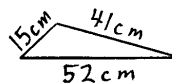
the square root algorithm, we get an area of 26.83m<sup>2</sup>.

Calculate the area.

- a)



- b)



- 3) **Area Efficiency.**

You are given 120m of fence. How much area is enclosed by the fence if the fence forms the shape of...

- a) a square?

- b) an equilateral triangle?

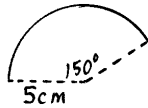
- c) a regular hexagon?

- d) a circle?

- e) Which shape encloses area the most efficiently?

# Mensuration – Practice Sheet #5

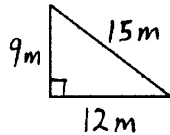
- 1) Given this portion of a circle...



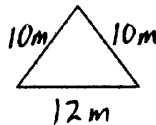
- a) Calculate the arc length.
- b) Calculate the area of the circle sector.

- 2) Calculate the area.

a)

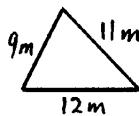


b)



- 3) Use Heron's formula to calculate the area.

a)

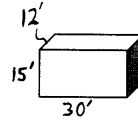


b)

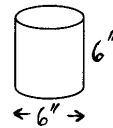


- 4) Calculate the volume and surface area of each solid.

a) A box.



b) A cylinder.



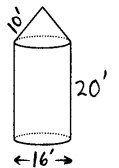
c) The Earth, which has a diameter of about 8000 miles.

- 5) Calculate the volume of each solid.

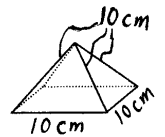
a) A cone.



b) A "pointed" cylinder.



c) A pyramid.



d) *Challenge!* A tetrahedron with all edges 10 cm long.

