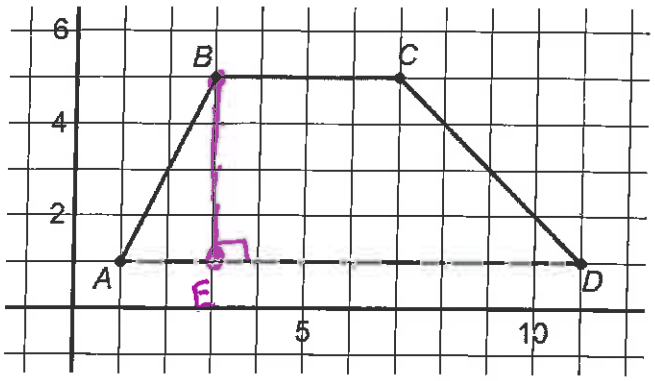
Geometry R – Mr. Bo
Unit 3 – Day 5 Notes

Name Notes.
Date

Trapezoids & Composite Area

Trapezoid: A trapezoid is a quadrilateral with 1 pair of parallel sides.

1.



a. To prove quadrilateral ABCD is a Trapezoid, you need to show it has 1 pair of parallel sides. How do you know quadrilateral ABCD has 1 pair of parallel sides?

$\overline{BC} \parallel \overline{AD}$ because they are both horizontal.

Trapezoid Parts:

2a. A trapezoid has two "**Bases**". They are always the 2 sides that are parallel. Name the 2 bases of trapezoid ABCD.

$\overline{BC}$ and $\overline{AD}$ are the parallel bases.

b. A trapezoid has two "**Legs**". They are always the 2 sides that are not parallel. Name the 2 legs of trapezoid ABCD.

$\overline{AB}$ and $\overline{CD}$ are the Legs.

c. The **height** (or Altitude) of a trapezoid is always the distance between the 2 bases. It can be represented by a segment that is drawn perpendicular to both bases. Draw and label the altitude of trapezoid ABCD, using point B as one of its endpoints. What did you name the altitude?

I named my altitude $\overline{BE}$.

Trapezoid Area: $Area = \frac{1}{2}(b_1 + b_2)h$ where b_1 and b_2 are the two bases.

3. Find the area of Trapezoid ABCD.

Base $AD = 10$

Base $BC = 4$

Height $BE = 4$

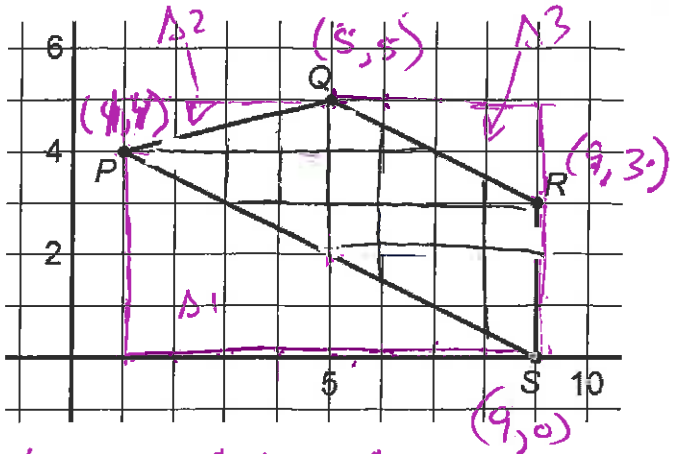
$Area = \frac{1}{2}(10+4)4$

$= \frac{1}{2}(14)(4)$

$= 28$ Sq. units.

4.

a. Prove quadrilateral PQRS is a trapezoid.



Slope $\overline{QR} = \frac{5-3}{5-9} = \frac{2}{-4} = \frac{1}{-2}$

Slope $\overline{PS} = \frac{4-0}{4-9} = \frac{4}{-8} = \frac{1}{-2}$

$\overline{QR} \parallel \overline{PS}$ because they have = slopes.

This makes PQRS a trapezoid because it has 1 pair of parallel sides.

b. Find the area of trapezoid ABCD.

Box method

Area Box = $(8)(5) = 40$

Area $\Delta 1 = \frac{1}{2}(8 \times 4) = 16$

$\Delta 2 = \frac{1}{2}(1 \times 4) = 2$

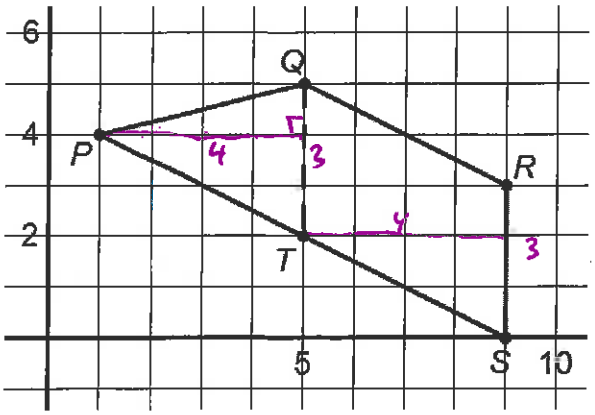
$\Delta 3 = \frac{1}{2}(4 \times 2) = 4$

Area trap = $40 - (16+2+4)$

$= 18$ sq. units.

5. Did you use the Box method to find the area of Trapezoid PQRS?

a. Consider, instead, if you had drawn segment QT inside the trapezoid. What 2 familiar shapes does this divide trapezoid PQRS into?



a triangle and a parallelogram.

b. How could you use triangle PQT and parallelogram QRST to find the area of trapezoid PQRS? Explain your reasoning.

I can find their areas and add them together.

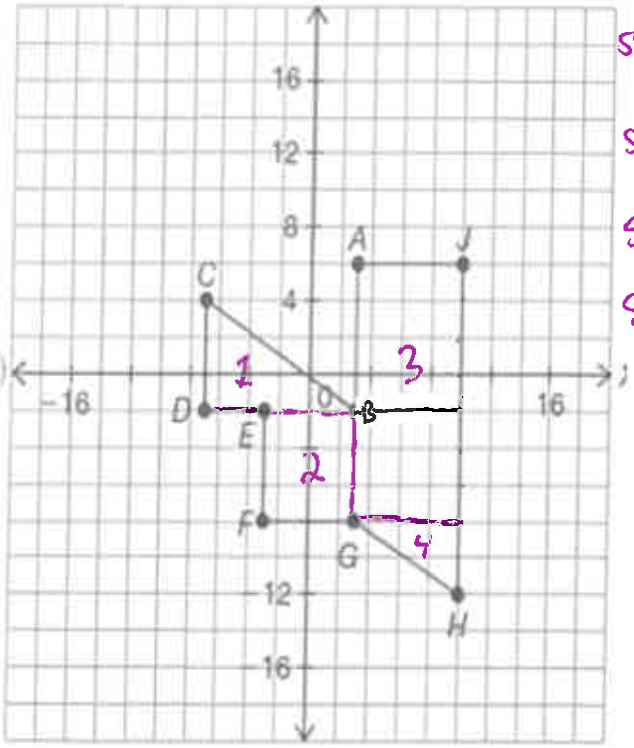
6. Dividing a figure up into familiar shapes to find the total area is called the **Composite Method**. Find the area of trapezoid PQRS using the *composite method*.

Area $\triangle = \frac{1}{2}(3 \times 4) = 6$

Area parallelogram $= (4 \times 3) = 12$

Area of trap $= 18$ sq. units

7. Use the **composite method** to find the area of the following figure. Divide the figure into smaller, familiar shapes (*triangles, rectangles, parallelograms, trapezoids*). *Round you answer to the nearest tenth.*



Shape #1 a triangle: Area $= \frac{1}{2}(10)(6) = 30$

Shape #2 Rectangle: Area $= (6 \times 6) = 36$

Shape #3 Rectangle: Area $= (7 \times 14) = 98$

Shape #4 triangle: Area $= \frac{1}{2}(4 \times 7) = 14$

Total Area $= 30 + 36 + 98 + 14$

$= 178$ sq. units.

* note the scale of the grid. each line is 2 units.