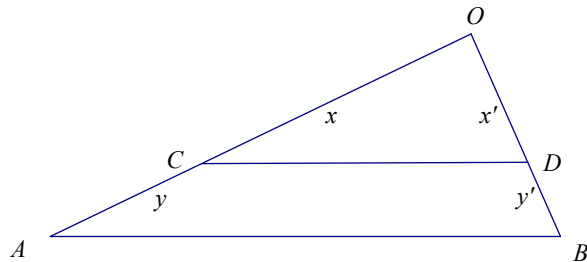


Lesson 19: Families of Parallel Lines and the Circumference of the Earth

Classwork

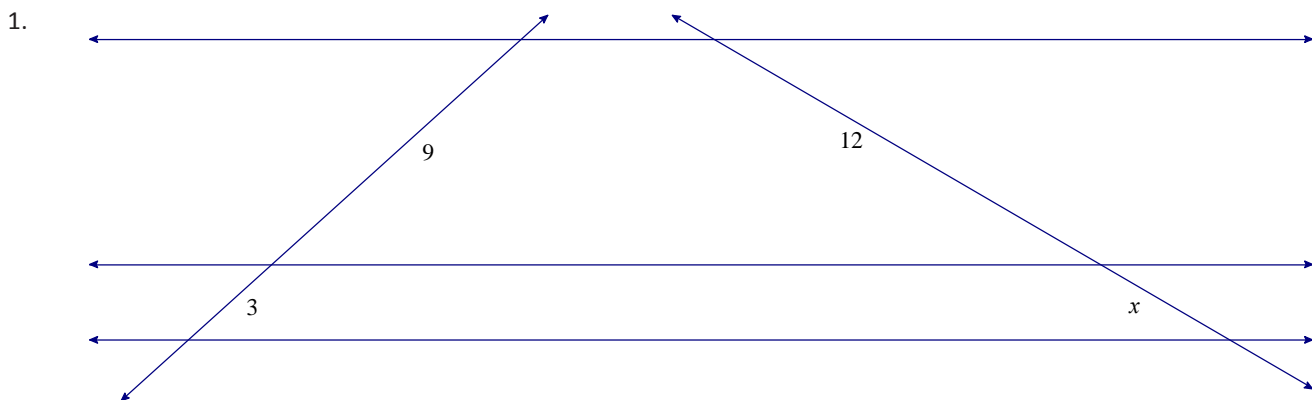
Opening Exercise

Show $x : y = x' : y'$ is equivalent to $x : x' = y : y'$.

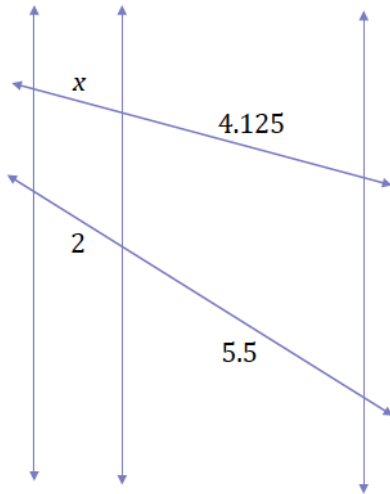


Exercises 1–2

Lines that appear to be parallel are in fact parallel.

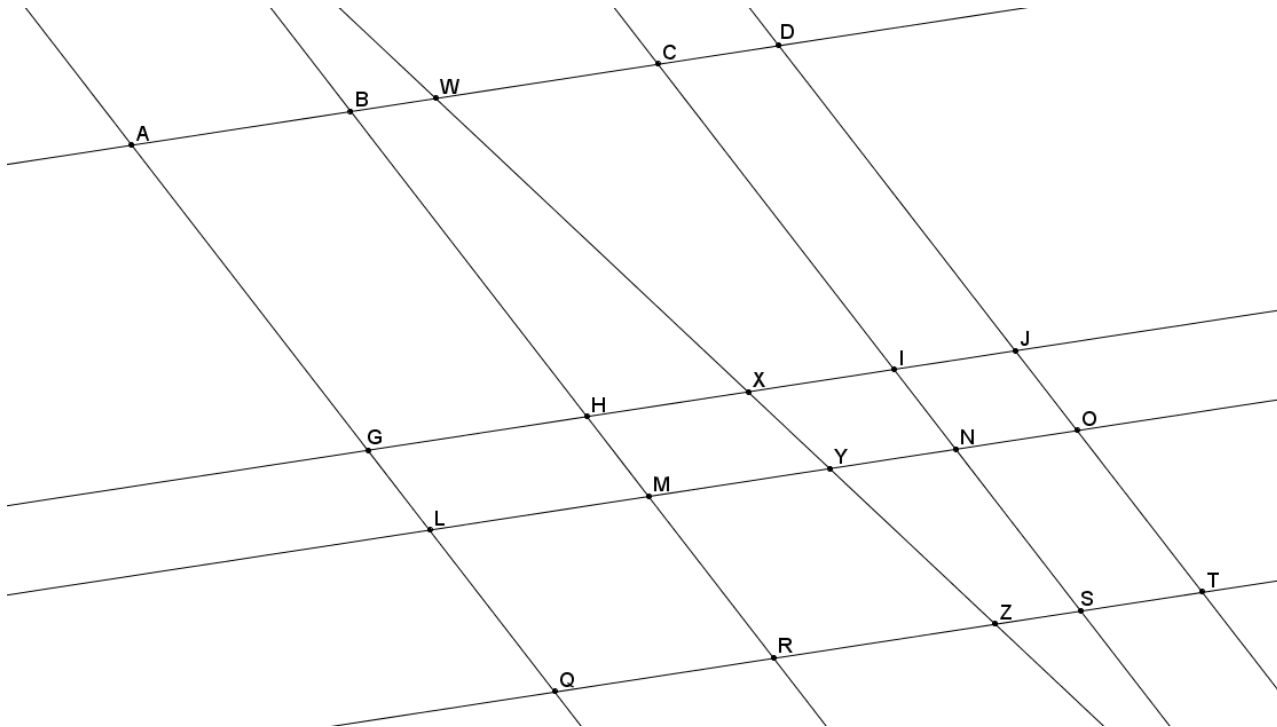


2.



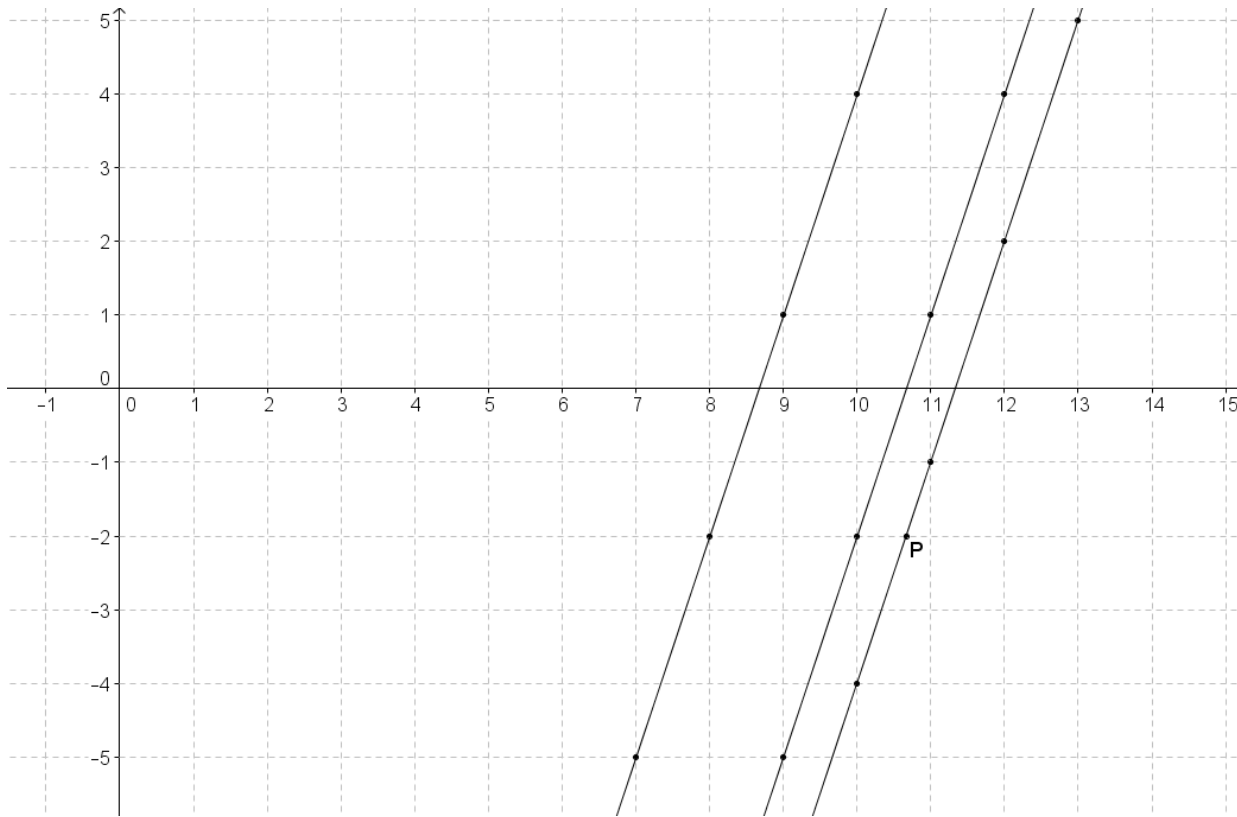
Problem Set

1. Given the diagram shown, $\overline{AD} \parallel \overline{GJ} \parallel \overline{LO} \parallel \overline{QT}$, and $\overline{AQ} \parallel \overline{BR} \parallel \overline{CS} \parallel \overline{DT}$. Use the additional information given in each part below to answer the questions:

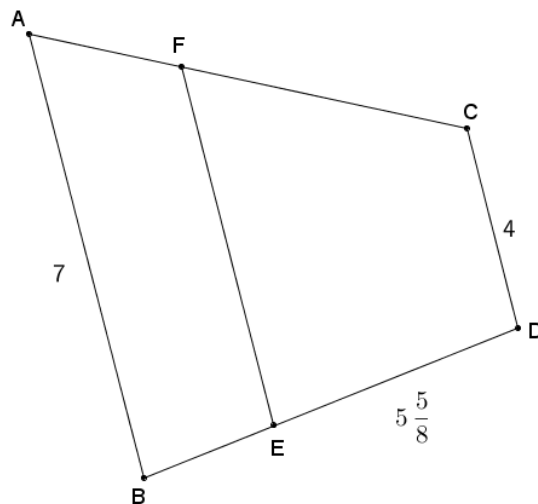


- If $GL = 4$, what is HM ?
- If $GL = 4$, $LQ = 9$, and $XY = 5$, what is YZ ?
- Using information from part (b), if $CI = 18$, what is WX ?

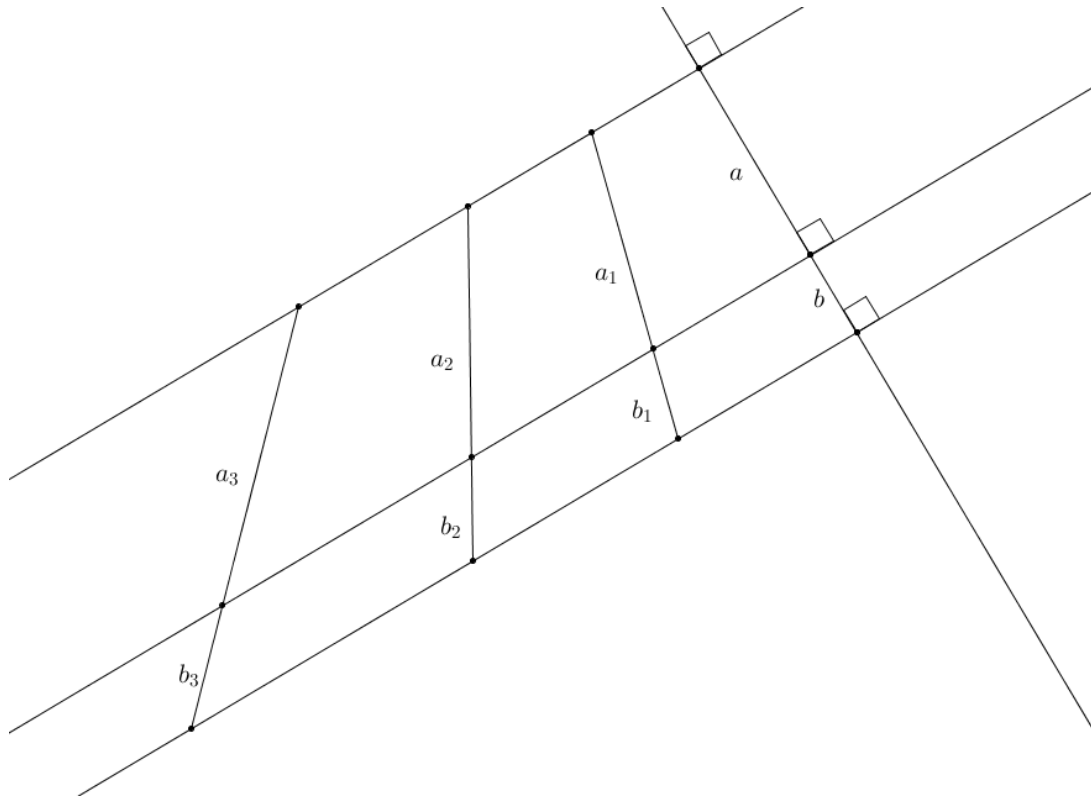
2. Use your knowledge about families of parallel lines to find the coordinates of point P on the coordinate plane below.



3. $ACDB$ and $FCDE$ are both trapezoids with bases \overline{AB} , \overline{FE} , and \overline{CD} . The perimeter of trapezoid $ACDB$ is $24\frac{1}{2}$. If the ratio of $AF:FC$ is $1:3$, $AB = 7$, and $ED = 5\frac{5}{8}$, find AF , FC , and BE .



4. Given the diagram and the ratio of $a : b$ is $3 : 2$, answer each question below:



- Write an equation for a_n in terms of b_n .
 - Write an equation for b_n in terms of a_n .
 - Use one of your equations to find b_1 in terms of a if $a_1 = 1.2(a)$.
 - What is the relationship between b_1 and b ?
 - What constant, c , relates b_1 and b ? Is this surprising? Why or why not?
 - Using the formula $a_n = c \cdot a_{n-1}$, find a_3 in terms of a .
 - Using the formula $b_n = c \cdot b_{n-1}$, find b_3 in terms of b .
 - Use your answers from parts (f) and (g) to calculate the value of the ratio of $a_3 : b_3$.
5. Julius wants to try to estimate the circumference of the earth based on measurements made near his home. He cannot find a location near his home where the sun is straight overhead. Will he be able to calculate the circumference of the earth? If so, explain and draw a diagram to support your claim.