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.

1. 
2. ****

Problem Set

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



* 1. If $GL=4$, what is $HM$?
	2. If $GL=4$, $LQ=9$, and $XY=5$, what is $YZ$?
	3. Using information from part (b), if $CI=18$, what is $WX$?
1. Use your knowledge about families of parallel lines to find the coordinates of point $P$ on the coordinate plane below.





1. $ACDB$ and $FCDE$ are both trapezoids with bases $\overbar{AB}$, $\overbar{FE}$, and $\overbar{CD}$. The perimeter of trapezoid $ACDB$ is $24\frac{1}{2}$. If the ratio of $AF:FC$ is $1:3$, and $ED=5\frac{5}{8}$, find $AF$, $FC$, and $BE$.
2. Given the diagram and the ratio of $a:b$ is $3:2$, answer each question below.



* 1. Write an equation for $a\_{n}$ in terms of $b\_{n}$.
	2. Write an equation for $b\_{n}$ in terms of $a\_{n}$.
	3. Use one of your equations to find $b\_{1}$ in terms of $a$ if $a\_{1}=1.2(a)$.
	4. What is the relationship between $b\_{1}$ and $b$?
	5. What constant, $c$, relates $b\_{1}$ and $b$? Is this surprising? Why or why not?
	6. Using the formula $a\_{n}=c⋅a\_{n-1}$, find $a\_{3}$ in terms of $a$.
	7. Using the formula $b\_{n}=c⋅b\_{n-1}$, find $b\_{3}$ in terms of $b$.
	8. Use your answers from parts (f) and (g) to calculate the value of the ratio of $a\_{3}:b\_{3}$?
1. 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.