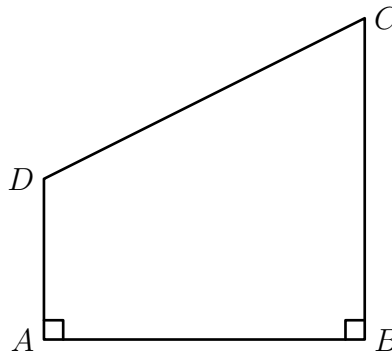


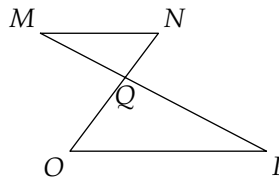


Try these problems before watching the lesson.

- Point A is on segment \overline{BC} such that $BA : AC = 3 : 2$. If $BC = 45$, then what is the length of \overline{AC} ?
- In trapezoid $ABCD$, $AB = BC = 2AD$ and $AD = 5$ units. What is the area of trapezoid $ABCD$?



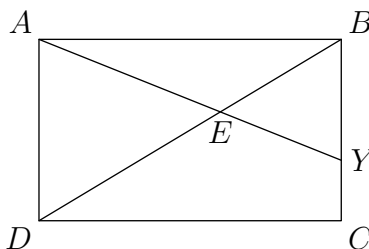
- In the diagram below, $\overline{MN} \parallel \overline{OP}$, $MN = 12$, and $OP = 20$. If $ON = 24$, then what is QN ?



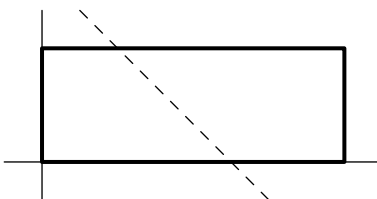
- Points $A(0, 0)$, $B(6, 0)$, $C(6, 10)$ and $D(0, 10)$ are vertices of rectangle $ABCD$, and E is on segment CD at $(2, 10)$. What is the ratio of the area of triangle ADE to the area of quadrilateral $ABCE$? Express your answer as a common fraction.

 *The Problems*

First Problem: In rectangle $ABCD$, side AB has length 10 cm and side BC has length 6 cm. Point Y is on side BC such that $CY = 2$ cm. Segment AY intersects diagonal BD at point E . What is the length of segment AE ?

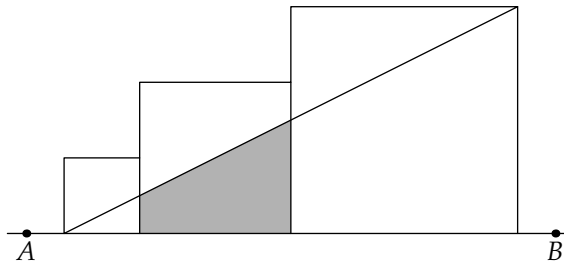


Second Problem: The line $x + y = 5$ intersects a rectangle with vertices at $(0, 0)$, $(0, 3)$, $(8, 0)$ and $(8, 3)$, dividing it into two regions as shown. What is the ratio of the area of the smaller region to the area of the larger region?

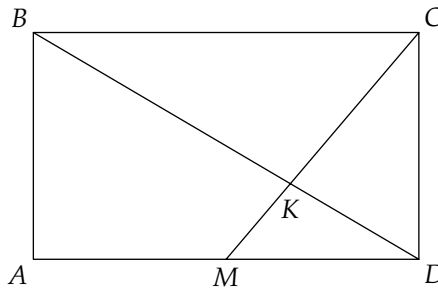


 *Follow-up Problems*

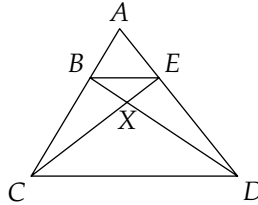
5. Three coplanar squares with sides of lengths two, four, and six units, respectively, are arranged side-by-side, as shown so that one side of each square lies on line AB and a segment connects the bottom left corner of the smallest square to the upper right corner of the largest square. What is the area of the shaded quadrilateral?



6. What is the area, in square units, of the interior region formed by the lines $y = 2x - 4$, $y = -3x + 16$ and the y -axis?
7. In rectangle $ABCD$, $AB = 6$ units, the measure of $\angle DBC$ is 30° , M is the midpoint of segment \overline{AD} and segments \overline{CM} and \overline{BD} intersect at point K . What is the length of segment \overline{MK} ?



8. In the diagram below, $\overline{BE} \parallel \overline{CD}$. If the area of trapezoid $BCDE$ is 8 times the area of $\triangle ABE$, and the area of $\triangle CDX$ is 27 square units, then what is the area of $\triangle ACD$?



Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).