GEOMETRY 10b Lesson A Week Three
Mr. Dinallo

There are two lessons for class 10b. You are to do lesson A if your name is listed below.

If your name is not listed below you are to do lesson B.

The following students are to complete this: lesson A.
K Akda, S Akda Beckerman, Bensoussan, Pinsky, Teitelbaum, Wohlgemuth, Zagelmaum (8)

Coordinate geometry lesson A
Learning intention: how to find the area of an irregular shape.

Materials: for this lesson students graph paper and ruler

Read pages in the Barron's pages: 100 and 101 or see attachments on the left if you do not have Barron's textbook.

Assignment: take graph paper and plot the 5 points below:

i. A(2,1), B(5,3), C(8,1), D(13,5) and E(2,5)

ii. Having plotted the above points, label the 5 sided figure following same labeling scheme in the the third attachment below: open 3rd attachment.

iii. Connect the dots and find the area of the irregular pentagon?

Submit your work.

- Apply the formula for the x-coordinate.

  ratio $= \dfrac{x - x_1}{x_2 - x}$

$$\frac{2}{3} = \frac{x-1}{11-x}$$
$$2(11 - x) = 3(x - 1)$$
$$22 - 2x = 3x - 3$$
$$25 = 5x$$
$$x = 5$$

- Repeat the process for the y-coordinate.

  ratio $= \dfrac{y - y_1}{y_2 - y}$

$$\frac{2}{3} = \frac{y-(-2)}{3-y}$$
$$3y + 6 = 6 - 2y$$
$$5y = 0$$
$$y = 0$$

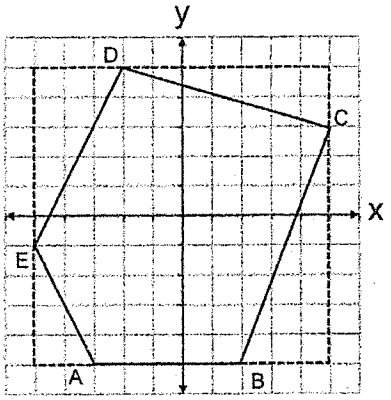
Point $L(5, 0)$ divides $\overline{JK}$ in a 2:3 ratio.

AREA AND PERIMETER

The lengths found with the distance formula can be used to calculate the perimeter and area of figures. If the figure is irregular, three strategies can be used:

- Divide the figure into shapes whose areas can be calculated easily (squares, rectangles, triangles, trapezoids, and circles).
- Sketch a bounding rectangle around the figure. Calculate the area of the rectangle, and then subtract the area of all the triangles that fall outside the figure but with the rectangle.
- If the figure has curves, estimate the area by modeling the curved sides with straight segments. The more segments that are used to model a curve, the more accurate the result will be.

Example:
Find the area of polygon $ABCDE$, with vertices $A(-3, -5)$, $B(2, -5)$, $C(5, 3)$, $D(-2, 5)$, and $E(-5, -1)$.



Solution:
Sketch the bounding rectangle in around $ABCDE$.

The length is 10 and the width is 10, giving an area of 100.

The triangles have areas:

$$\text{upper left triangle} = \frac{1}{2}(3 \cdot 6) = 9$$

$$\text{upper right triangle} = \frac{1}{2}(7 \cdot 2) = 7$$

$$\text{lower left triangle} = \frac{1}{2}(4 \cdot 2) = 4$$

$$\text{lower right triangle} = \frac{1}{2}(3 \cdot 8) = 12$$

The area of $ABCDE = 100 - 9 - 7 - 4 - 12 = 68$

COLLINEARITY

Three points are **collinear** if the slopes between any two pairs are equal. For example, points A, B, and C are collinear if the slope of $\overline{AB}$ equals the slope of $\overline{BC}$.

EQUATIONS OF LINES

- The slopes of parallel lines are equal.
- The slopes of perpendicular lines are negative reciprocals. (If the slope of line m is $\frac{2}{3}$, then the slope of any line perpendicular to m is $-\frac{3}{2}$.)

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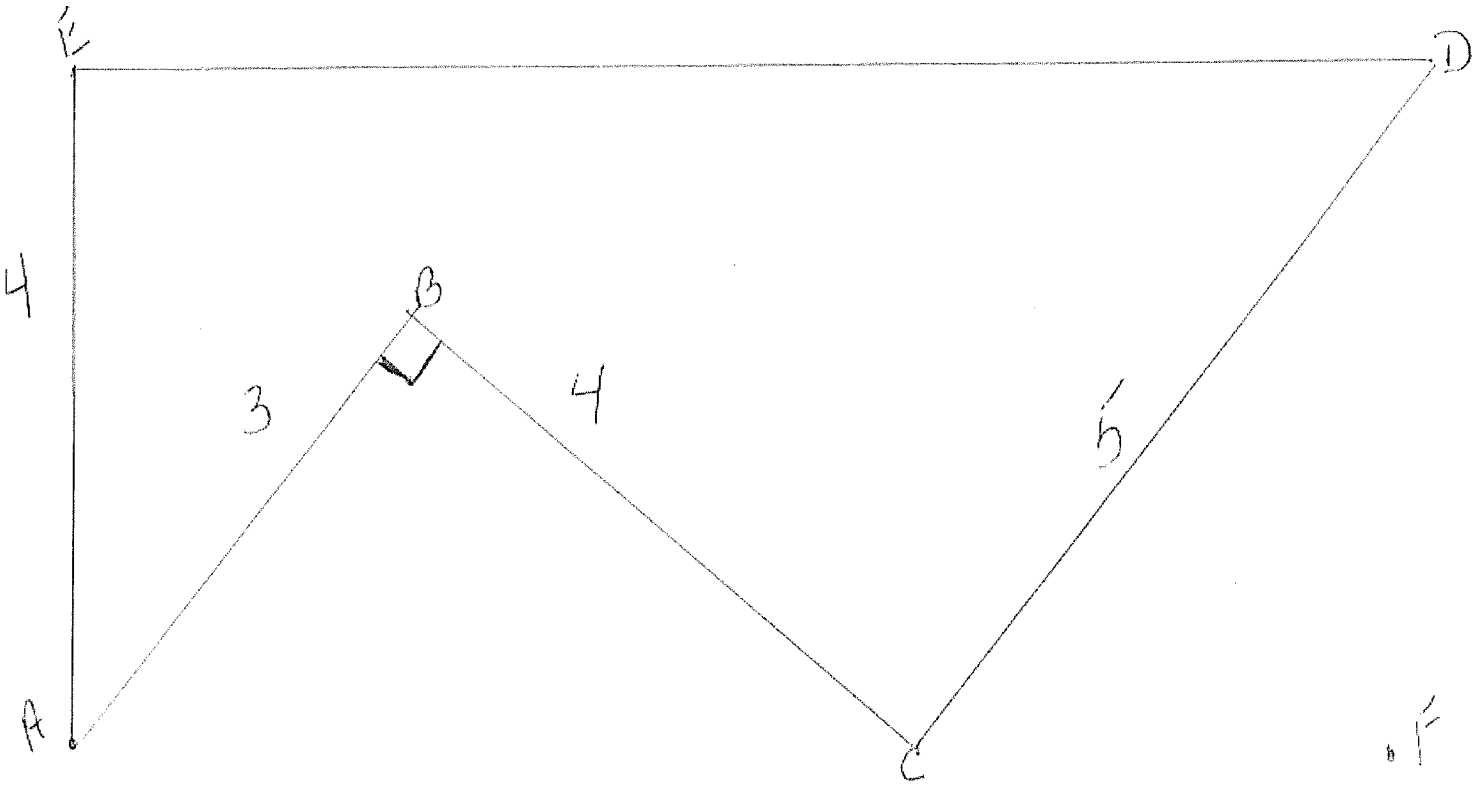

(not drawn to scale)