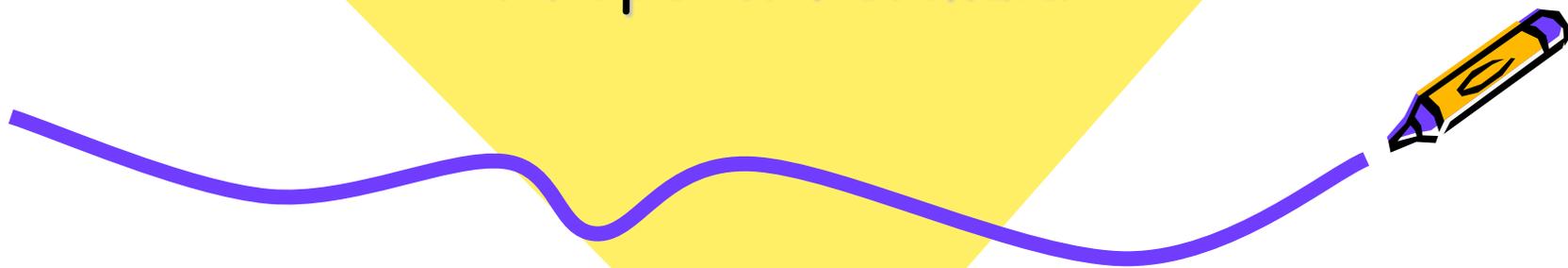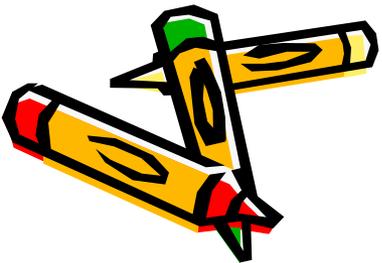# Geometry

Midpoint Formula

Midpoint and Segment Bisector

- Midpoint: The point that divides the segment into two congruent segments. The midpoint is equidistant from both endpoints.

- Segment Bisector: A point, line, ray, line segment, or plane that intersects the segment at its midpoint.

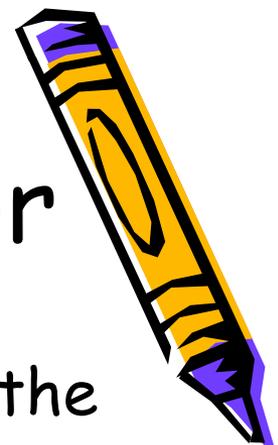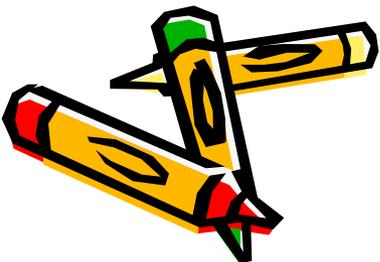# Midpoint and Segment Bisector

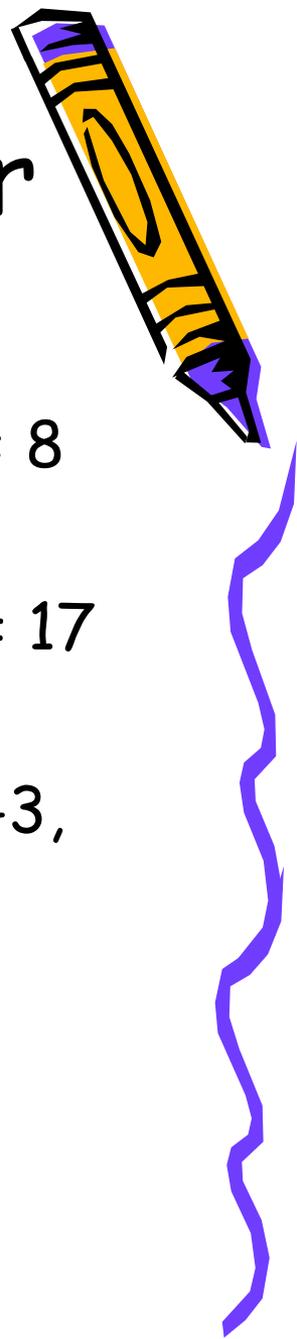On a number line the midpoint is the average of the two points: midpoint = $\dfrac{X_1 + X_2}{2}$

Find the midpoint of $\overline{AB}$, when A=8 and B=22
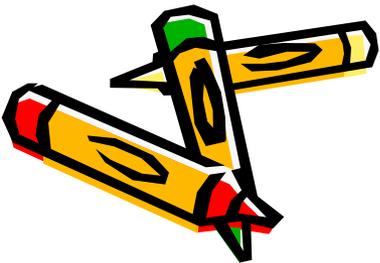
midpoint = $\dfrac{8 + 22}{2}$ = 15

The value 15 is 7 units from 8
and 7 seven units from 22

Midpoint and Segment Bisector

1. Find the midpoint of $\overline{AB}$, when A = -4 and B = 8

2. Find B, when A = 10 and the midpoint of $\overline{AB}$ = 17

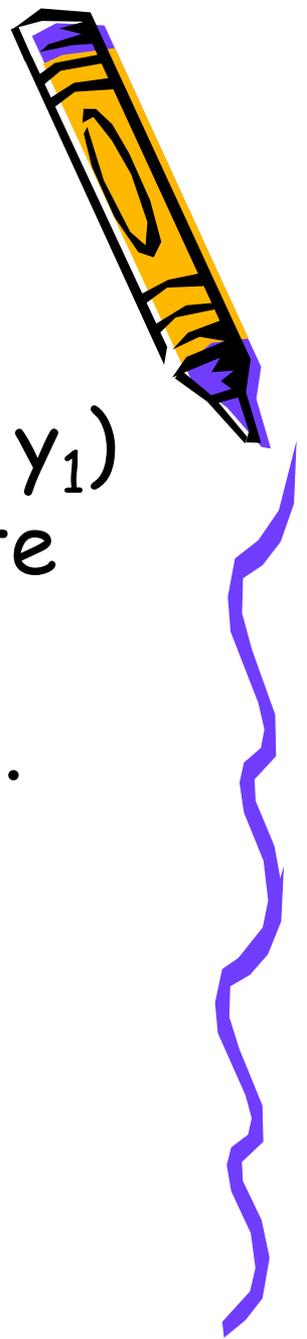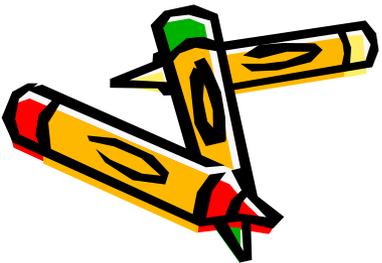3. R is the midpoint of $\overline{PQ}$. If Q = -12 and R = -3, find P

Midpoint Formula

To find the midpoint of point $A(x_1, y_1)$ and point $B(x_2, y_2)$, on the coordinate plane: average the x and y values to find the coordinate of the midpoint.

midpoint:

$$M(x_m, y_m) = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

Examples

Find the coordinates of the midpoint of the segment with the given endpoints.

8. $S(4, -1)$ and $T(6, 0)$ **9.** $L(4, 2)$ and $P(0, 2)$

Use the given endpoint R and midpoint M of $\overline{RS}$ to find the coordinates of the other endpoints.

12. $R(6, 0), M(0, 2)$ **13.** $R(3, 4), M(3, -2)$