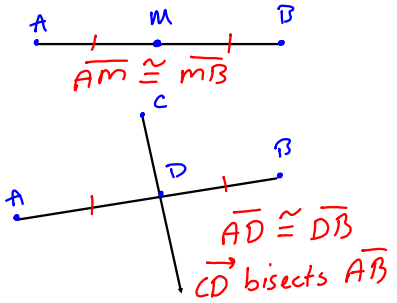
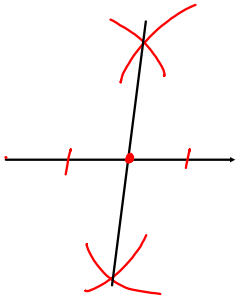
1.5 Segment and Angle Bisectors

Midpoint – A point that divides a segment into two equal parts

Segment Bisector – A line, ray, or segment that intersects a segment at its midpoint





Midpoint Formula

$A = (x_1, y_1)$ $B(x_2, y_2)$

Distance
2

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

$A(-2, 3)$ $B(5, -2)$

$$M\left(\frac{-2+5}{2}, \frac{3+(-2)}{2}\right) = \left(\frac{3}{2}, \frac{1}{2}\right)$$

$D(3, 5)$ $E(-4, 0)$

$$M = \left(\frac{3+(-4)}{2}, \frac{5+0}{2}\right) = \left(-\frac{1}{2}, \frac{5}{2}\right)$$

M, A Find B $(-3, -1)$

$M(3, -4)$ $A(9, -7)$

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

$$3 = \frac{9 + x_2}{2} \qquad -4 = \frac{-7 + y_2}{2} \quad \text{multiply 2}$$

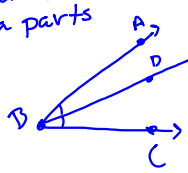
$$6 = 9 + x_2 \qquad -8 = -7 + y_2$$

$$-9 \quad -9 \qquad +7 \quad +7$$

$$-3 = x_2 \qquad -1 = y_2$$

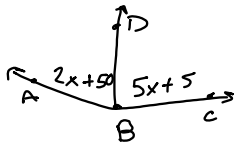
Angle Bisector

- A ray that has the same initial point and a point that is in the interior the angle that divides the angle into two equa parts



$\overrightarrow{BD}$ bisects $\angle ABC$

$\angle ABD \cong \angle DBC$



$\overrightarrow{BD}$ bisects $\angle ABC$

$2x+50 = 5x+5$

$-5 \quad -5$

$2x+45 = 5x$

$-2x \quad -2x$

$\frac{45}{3} = \frac{3x}{3}$

$15 = x$

$m\angle ABD = 80°$

$m\angle DBC = 80°$

$m\angle ABC = 160°$

$\overrightarrow{RQ}$ bisects $\angle PRS$

$m\angle PRQ = x+40$

$m\angle QRS = 3x-20$

what is $m\angle PRS$

$x+40 = 3x-20$

$+20 \quad +20$

$x+60 = 3x$

$-x \quad -x$

$\frac{60}{2} = \frac{2x}{2}$

$30 = x$

$30+40 = 70$

$90-20 = 70$

$m\angle PRS = 140$

P 38-40

4-12, 18-32, 38-54 evens