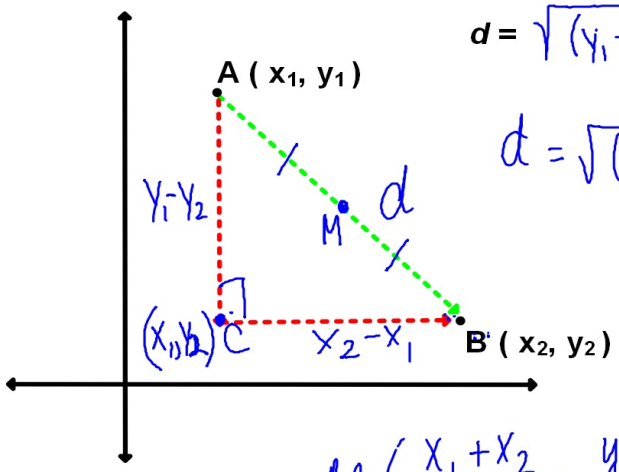
10-1 Distance and Midpoint Formulas

$d^2 = (AC)^2 + (CB)^2$

$d = \sqrt{(y_1 - y_2)^2 + (x_2 - x_1)^2}$

$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ distance formula



midpoint of $\overline{AB}$ $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

ex. 1 Given: C(-3, 21) and D(2, -4)

Find length and midpoint of $\overline{CD}$

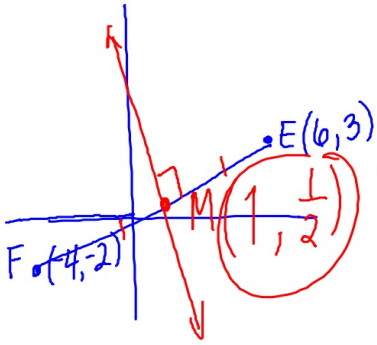
length of $\overline{CD} = \sqrt{(-3-2)^2 + (21-(-4))^2}$

$\sqrt{(-5)^2 + (25)^2} = \sqrt{650} = \sqrt{25}\sqrt{26} = 5\sqrt{26}$

Midpt $\left(\frac{-3+2}{2}, \frac{21+-4}{2}\right)$

$\left(-\frac{1}{2}, \frac{17}{2}\right)$

ex. 2 Find the equation of the perpendicular bisector of a segment with endpoints E(6, 3) and F(-4, -2).



Slope $\overline{EF} = \frac{5}{10} = \frac{1}{2}$

$\perp$ slope $= -2$

$y - \frac{1}{2} = -2(x - 1)$

$\frac{1}{2} = -2(1) + b$

$y = -2x + \frac{5}{2}$

ex. 3

△RST has vertices (2, -1), (4, 2), and (5, 0). Is the triangle *scalene, isosceles, or equilateral*?

R S T

no = sides 2 = sides 3 = sides

$RS = \sqrt{(-2)^2 + (-3)^2} = \sqrt{13}$

$ST = \sqrt{(-1)^2 + 2^2} = \sqrt{5}$

$RT = \sqrt{(-3)^2 + (-1)^2} = \sqrt{10}$

Scalene Δ