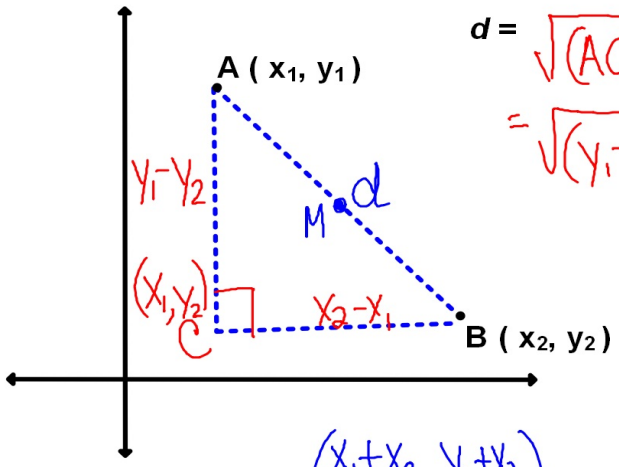
10-1 Distance and Midpoint Formulas



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

$d = \sqrt{(AC)^2 + (CB)^2}$

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

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

Distance formula

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

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ex. 1

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

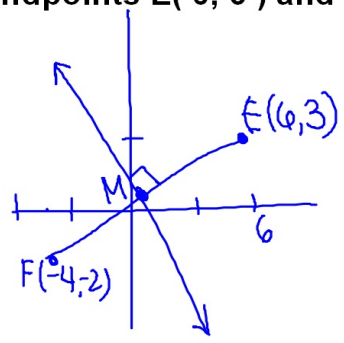
Find length and midpoint of $\overline{CD}$

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

midpt of $\overline{CD} = \left(-\frac{1}{2}, \frac{17}{2}\right)$

ex. 2

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



$M\left(1, \frac{1}{2}\right)$ slope $\overline{EF} = \frac{1}{2}$

$\perp$ slope -2

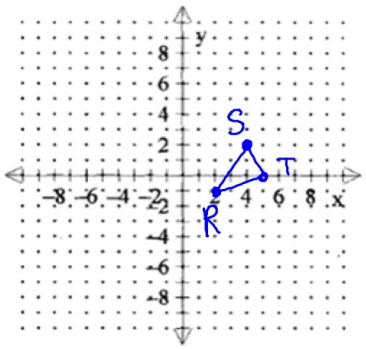
$y = -2x + \frac{5}{2}$

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

$2\frac{1}{2} = b$

R S T

ex. 3 △RST has vertices (2, -1), (4, 2), and (5, 0). Is the triangle *scalene, isosceles, or equilateral*?



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

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

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

Scalene