January 30, 2017

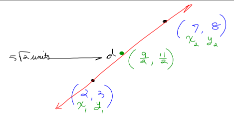
2.1 Distance Formula

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

Mid-Point

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

Jan 30-11:00 AM



Distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(7-2)^2 + (8-3)^2}$$
$$= \sqrt{(5)^2 + (5)^2}$$
$$= \sqrt{25 + 25}$$
$$= \sqrt{50} \text{ units}$$
$$= \sqrt{25 \cdot 2}$$
$$d = 5\sqrt{2} \text{ units}$$

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

$$= \left(\frac{7+2}{2}, \frac{8+3}{2} \right)$$
$$= \left(\frac{9}{2}, \frac{11}{2} \right)$$

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$(\sqrt{5}, -\sqrt{2})$ & $(4\sqrt{5}, -7\sqrt{2})$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

$$d = \sqrt{(4\sqrt{5} - \sqrt{5})^2 + (-7\sqrt{2} - (-\sqrt{2}))^2}$$
$$= \sqrt{(3\sqrt{5})^2 + (-6\sqrt{2})^2}$$
$$= \sqrt{45 + 72}$$
$$= \sqrt{117}$$
$$= \sqrt{9 \cdot 13}$$
$$= 3\sqrt{13} \text{ units}$$

mid $\left(\frac{4\sqrt{5} + \sqrt{5}}{2}, \frac{-7\sqrt{2} + (-\sqrt{2})}{2} \right)$

$$\left(\frac{5\sqrt{5}}{2}, \frac{-8\sqrt{2}}{2} \right)$$
$$\left(\frac{5\sqrt{5}}{2}, \frac{-4\sqrt{2}}{1} \right)$$

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$$2x^5 - 3x^4 + x^3 = 0$$

* 5 solutions

$$x^3 (2x^2 - 3x + 1 = 0)$$

- factoring
- Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad a = 2,\; b = -3,\; c = 1$$

$$= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(1)}}{2(2)}$$
$$= \frac{3 \pm \sqrt{9 - 8}}{4}$$
$$= \frac{3 \pm \sqrt{1}}{4}$$
$$= \frac{3 \pm 1}{4}$$
$$x = 1, \quad x = \frac{1}{2}$$

Solutions

$x = 1$

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

$x = 0$

$$\sqrt[3]{x^3} = \sqrt[3]{0}$$
$$x = 0$$

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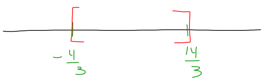
$$|3x - 5| - 12 \le -3$$
$$\quad +12 \quad +12$$
$$|3x - 5| \le 9 \qquad k > 0 \checkmark$$
$$-9 \le 3x - 5 \le 9$$
$$+5 \quad +5 \quad +5$$
$$\frac{-4}{3} \le \frac{3x}{3} \le \frac{14}{3}$$
$$-\frac{4}{3} \le x \le \frac{14}{3}$$



$$\left[-\frac{4}{3}, \frac{14}{3} \right]$$

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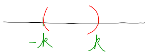
ABS Inequalities

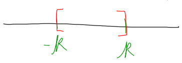
$$|a| = \begin{cases} a & \text{if } a \ge 0 \\ -a & \text{if } a < 0 \end{cases}$$

① $|a| < k \leftrightarrow -k < a < k$



$(-k, k)$

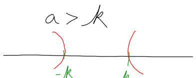
$|a| \le k \qquad -k \le a \le k$



$[-k, k]$

② $|a| > k \leftrightarrow a < -k$ or $(\cup)$

$a > k$



$(-\infty, -k) \cup (k, \infty)$

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