1.5 Cont'd

Ex: Solve

a) $3 < 7x - 4 \leq 10$

$7 < 7x \leq 14$

$1 < x \leq 2$

b) $-2 < \frac{4-2x}{3} < 8$

$-6 < 4 - 2x < 24$

$-10 < -2x < 20$

$\div(-2)$ $\quad 5 > x > -10$ ✓

Rewrite $\quad -10 < x < 5$ ✓

Ex: Rewrite $3 < x < 4$ in the form $a < 2x+7 < b$

$3 < x < 4$

$6 < 2x < 8$

$13 < 2x+7 < 15$

For any real # a, $a^2 \geq 0$

For any real # a, $a^2 \geq 0$

Ex: Solve and graph

$$x^2 \geq -1$$

Answer: all real # or $(-\infty, \infty)$

or $-\infty < x < \infty$

Reciprocal Property

a and $\frac{1}{a}$ have the same sign $(a \neq 0)$

Ex: Solve $(8x-3)^{-1} > 0$

$$\frac{1}{8x-3} > 0$$

$8x-3 > 0$ (Reciprocal Property)

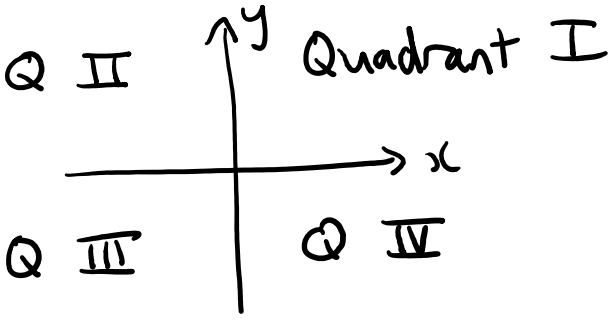
$8x > 3$

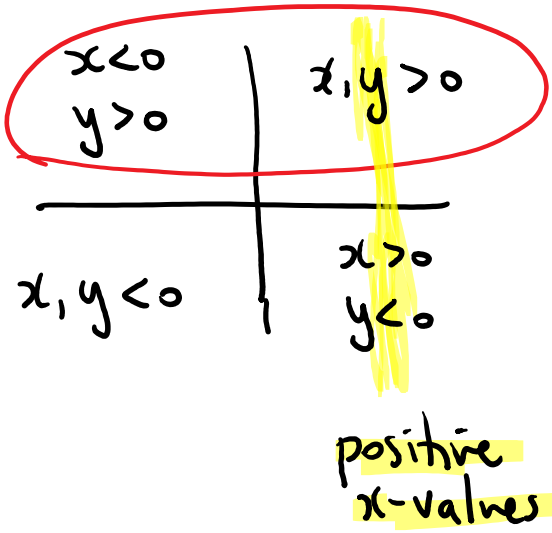
$x > \frac{3}{8}$

Ch 1 Algebra
Ch 2 Geometry

2.1 Distance and Midpoint

↑ y Quadrant I



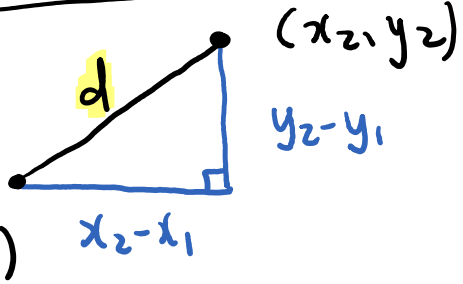


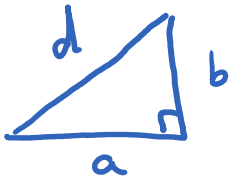
The distance between (x_1, y_1) and (x_2, y_2) is:

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

Know this ⭐

WHY?





$$d^2 = a^2 + b^2$$

$$d^2 = a^2 + b^2$$

$$d = \sqrt{a^2 + b^2}$$

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

Ex: Find distance between $P(-6, 2)$ and $Q(-4, 7)$

(x_1, y_1) (x_2, y_2)

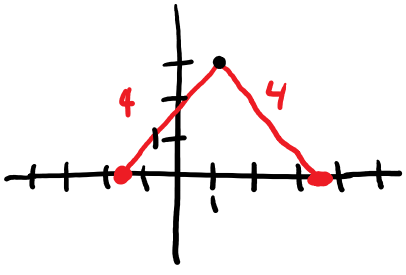
$$d(P, Q) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

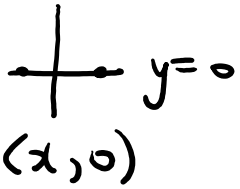
$$= \sqrt{(-4 + 6)^2 + (7 - 2)^2}$$

$$= \sqrt{2^2 + 5^2}$$

$$= \sqrt{29}$$

Ex: Find all points on x-axis that are 4 units from $(1, 3)$





4 is the distance between $(x, 0)$ and $(1, 3)$

$$4 = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$4 = \sqrt{(1-x)^2 + (3-0)^2}$$

S.B.S.

$$16 = (1-x)^2 + (3-0)^2$$

$$16 = (1-x)^2 + 9$$

$$7 = (1-x)^2$$

$$(1-x)^2 = 7$$

Square root method

$$1-x = \pm\sqrt{7}$$

$$1 \pm \sqrt{7} = x$$

Points $(x, 0)$

$(1 \pm \sqrt{7}, 0)$