August 31, 2010

Note Title 8/31/2010

§1.7 #52)

$|x| \geq a \Rightarrow x \leq -a$ or $x \geq a$

$|4-3x| \geq 1$

$4-3x \leq -1$ or $4-3x \geq 1$

$-3x \leq -5$ $\quad$ $-3x \geq -3$

$\frac{-3x}{-3} \geq \frac{-5}{-3}$ $\quad$ $x \leq 1$

$x \geq 5/3$

$(-\infty, 1] \cup [5/3, \infty)$

#33

$|x^2+1| = 5$

$\mathbb{R} \rightarrow$ all real numbers

$(-\infty \ \infty)$

$x^2+1 = -5$ OR $x^2+1 = 5$

$x^2 = -6$ $\qquad$ $x^2 = 4$

$x = \pm\sqrt{6}\,i$ $\qquad$ $x = \pm 2$

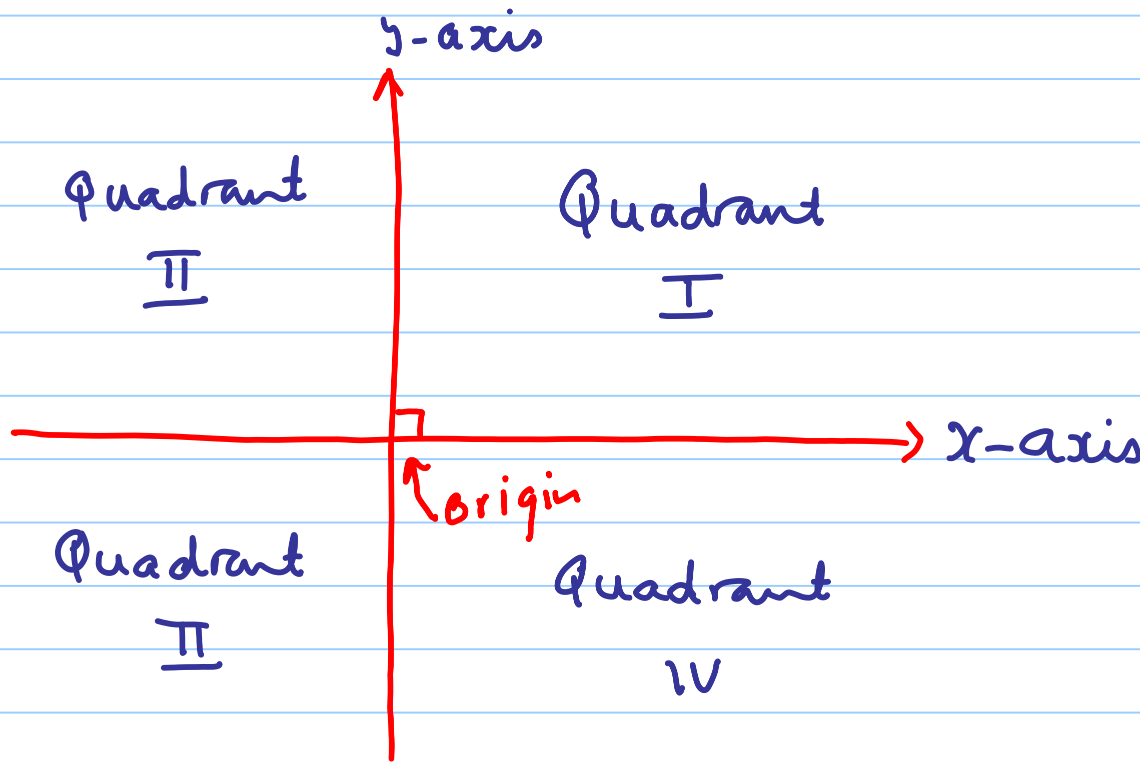
#34 $|x^2-1| = 5$

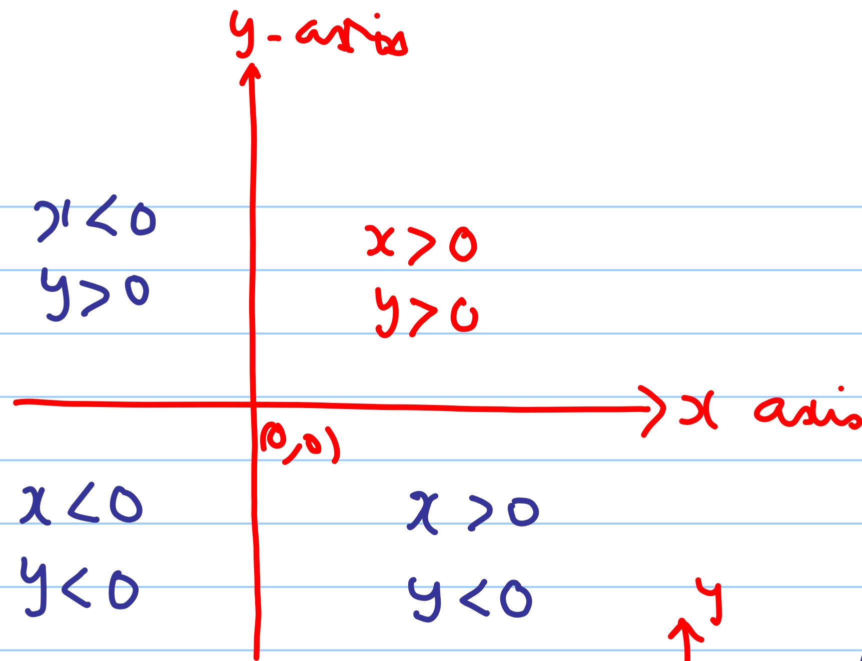
$x^2-1 = -5$ or $x^2-1 = 5$

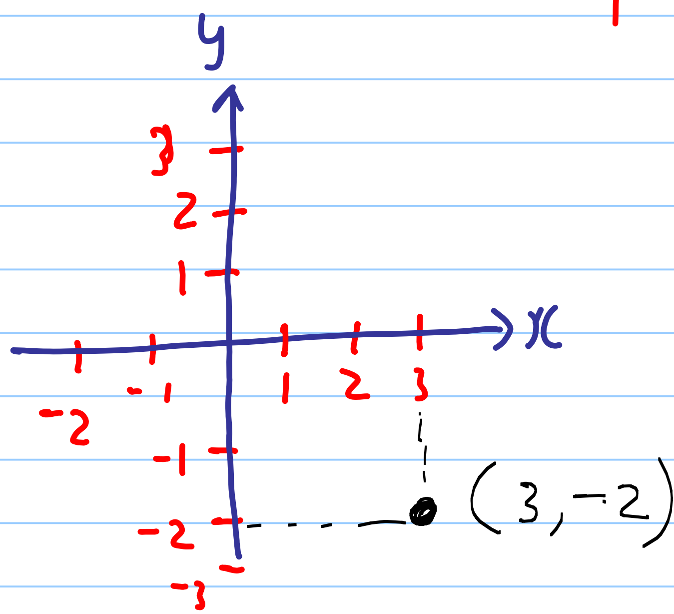
$x^2 = -4$ $\qquad$ $x^2 = 6$

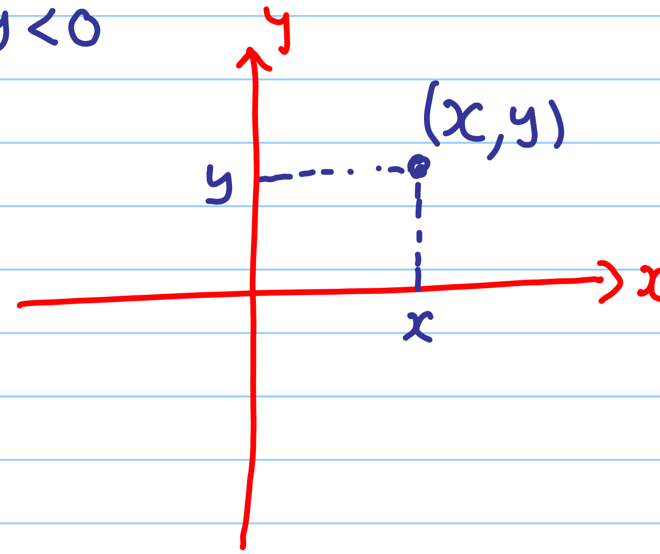
$x = \pm\sqrt{-4} = \pm 2i$ $\qquad$ $x = \pm\sqrt{6}$

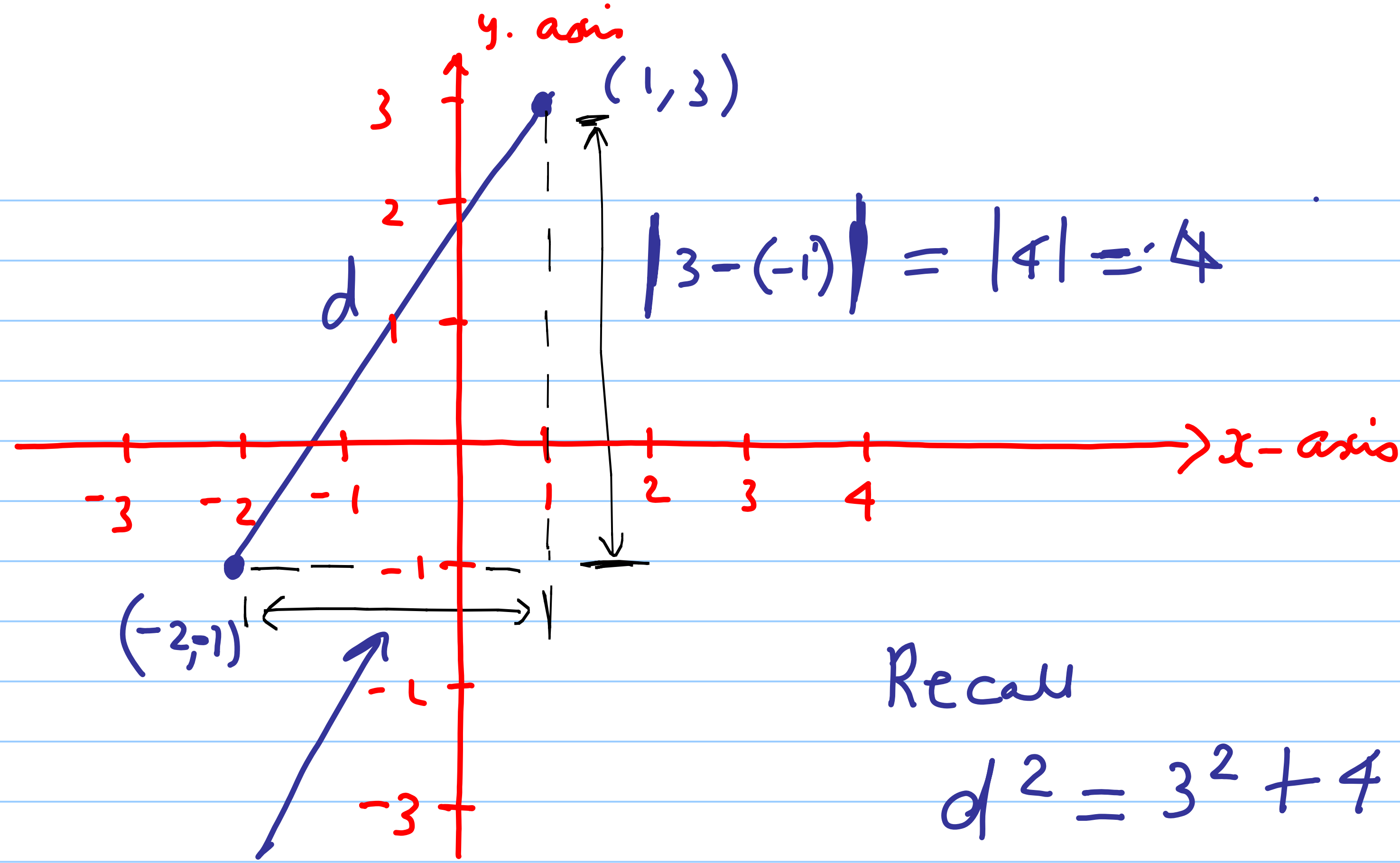
§2.1 Cartesian Plane




y-axis
x axis
(0,0)
x<0
y>0
x>0
y>0
x<0
y<0
x>0
y<0


y
x
1
2
3
-1
-2
-3
(3, -2)


y
x
(x,y)



$$|3-(-1)| = |4| = 4$$

$$|1-(-2)| = |3| = 3$$

Recall

$$d^2 = 3^2 + 4^2$$
$$= 25$$
$$\therefore d = \pm\sqrt{25}$$
$$= \pm 5$$

$$\boxed{\text{Take } d = +5}$$

Example

$P_1 = (-3, 7) \quad P_2 = (5, -2)$

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

$$= \sqrt{[5 - (-3)]^2 + [-2 - 7]^2}$$

$$= \sqrt{8^2 + (-9)^2}$$

$$= \sqrt{64 + 81}$$

$$= \sqrt{145}$$

Example

$P_1 = \left(\frac{7}{5}, \frac{1}{9}\right) \qquad P_2 = \left(\frac{1}{2}, -\frac{7}{3}\right)$

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

$$= \sqrt{\left(\frac{1}{2} - \frac{7}{5}\right)^2 + \left(-\frac{7}{3} - \frac{1}{9}\right)^2}$$

$$= \sqrt{\left(\frac{5}{10} - \frac{14}{10}\right)^2 + \left(-\frac{21}{9} - \frac{1}{9}\right)^2}$$

$$= \sqrt{\left(\frac{-9}{10}\right)^2 + \left(-\frac{22}{9}\right)^2}$$

$$= \sqrt{\frac{81}{100} + \frac{484}{81}}$$ Simplify!

<u>Example</u>

$(x_1, y_1) = (3\sqrt{5}, -3\sqrt{3})$ $(x_2, y_2) = (-\sqrt{5}, -\sqrt{3})$

$$d = \sqrt{\left(-\sqrt{5} - 3\sqrt{5}\right)^2 + \left[-\sqrt{3} - (-3\sqrt{3})\right]^2}$$

$$= \sqrt{\left(-4\sqrt{5}\right)^2 + \left(2\sqrt{3}\right)^2}$$

$$= \sqrt{16(5) + 4(3)}$$

$$= \sqrt{80 + 12}$$

$$= \sqrt{92}$$

$$= \sqrt{4(23)}$$

$$= 2\sqrt{23}$$