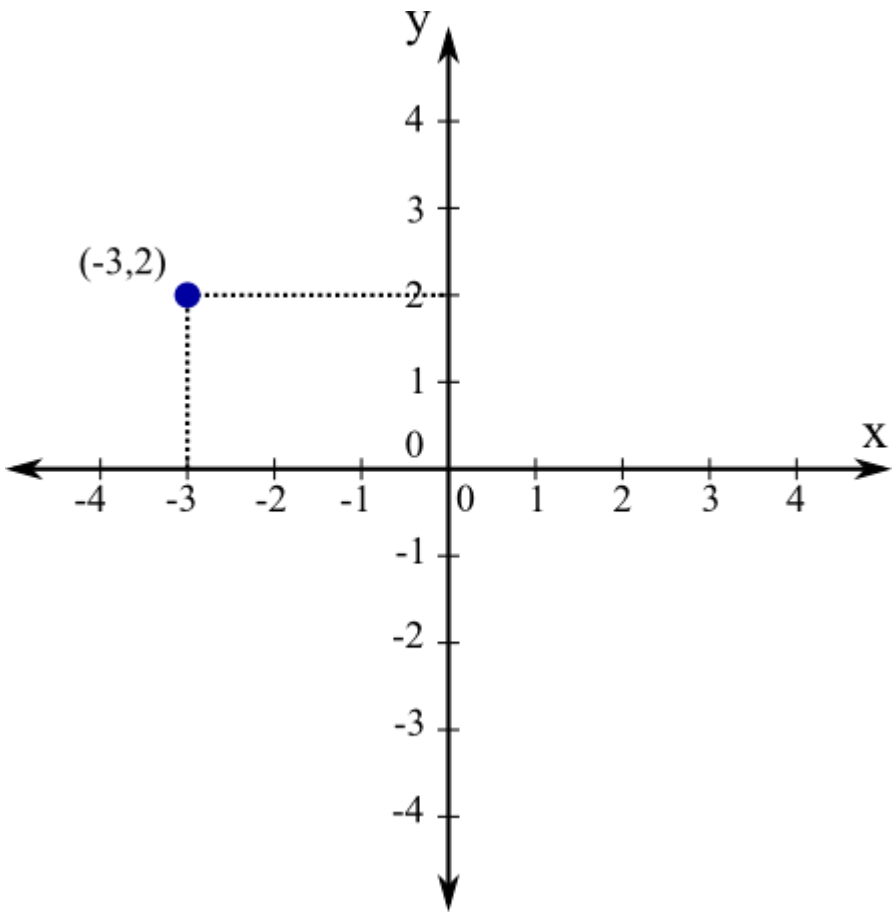
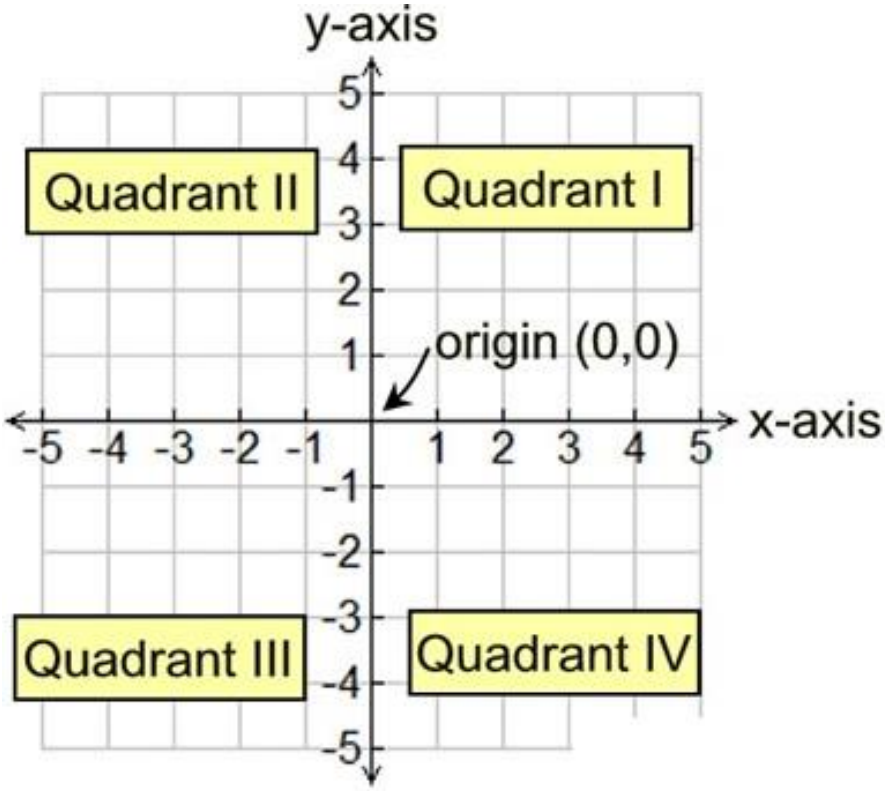


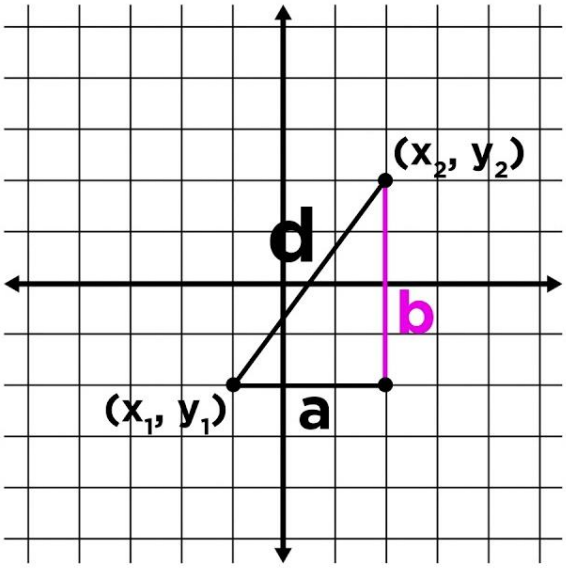
- Distance of a point from X axis is its y coordinate.
- Distance of a point from Y axis is its x coordinate.



Problem: If point A(a,b) lies in the second quadrant then point B (a,-b) lies in which quadrant?

If point A(a,b) lies in the second quadrant then point B (a,-b) lies in which quadrant?
In second quadrant x is –ve i.e. a is –ve and y is +ve i.e. b is +ve.
Point B (a,-b), a is –ve and –b is –ve and therefore point B is in 3rd quadrant.

Distance between 2 points



solve for d

$a = x_2 - x_1$

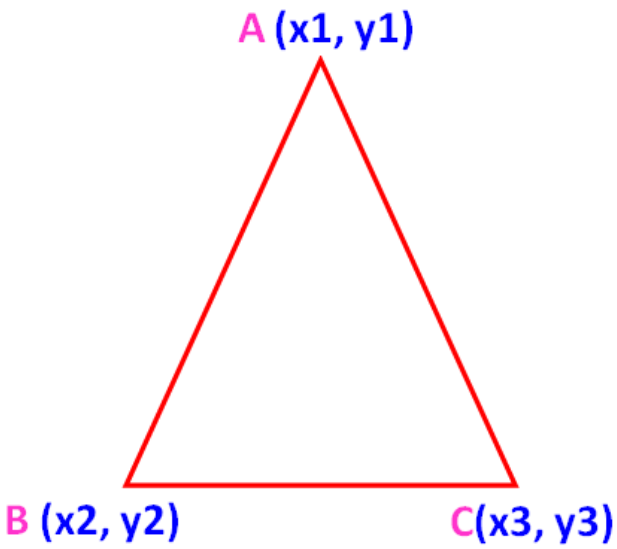
$b = y_2 - y_1$

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

Pythagorean Theorem

$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

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

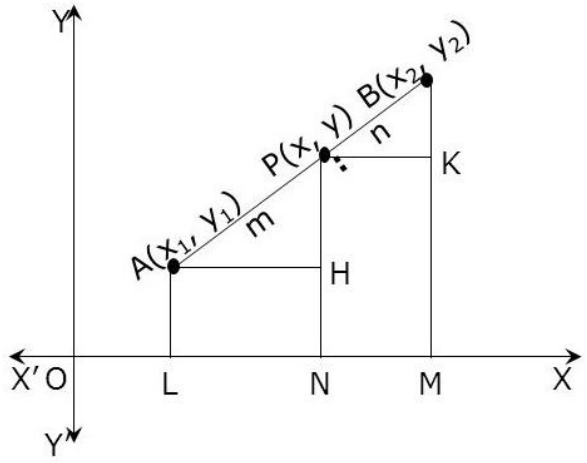


$$\text{Area of } \Delta = \frac{1}{2}\left\{x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right\}$$

Co-ordinates of Centroid G(x,y)

$$x = \frac{x_1+x_2+x_3}{3} \text{ and } y = \frac{y_1+y_2+y_3}{3}$$

Section Formula – Internal Division

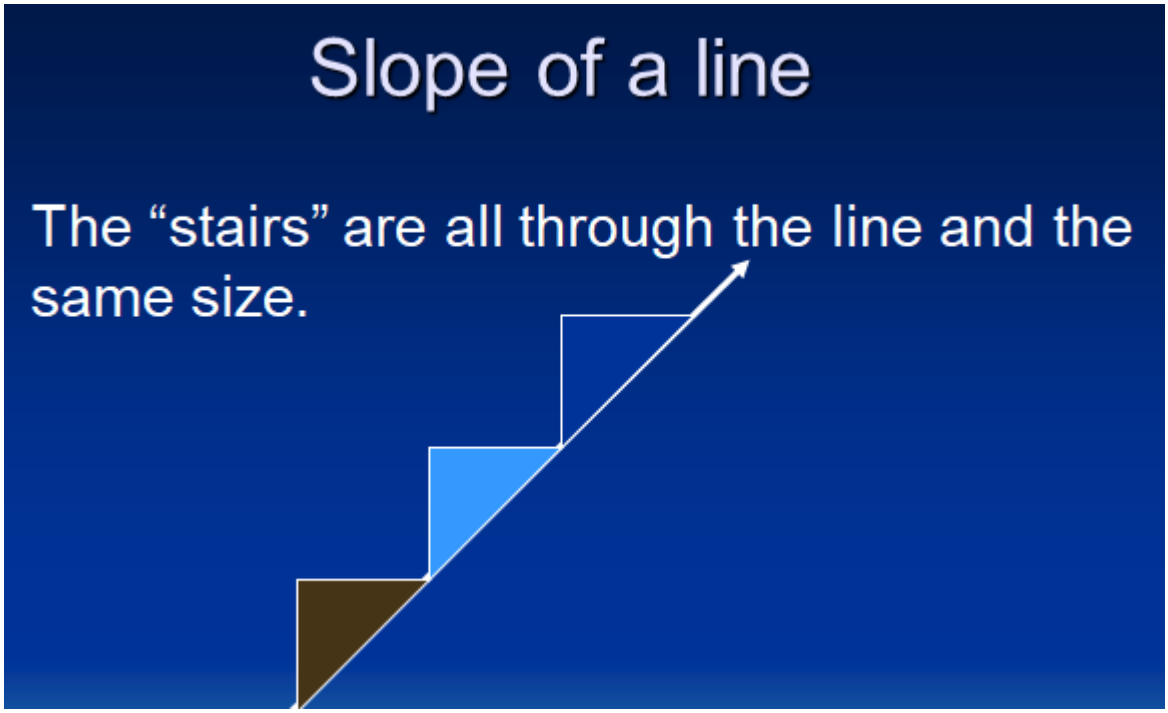


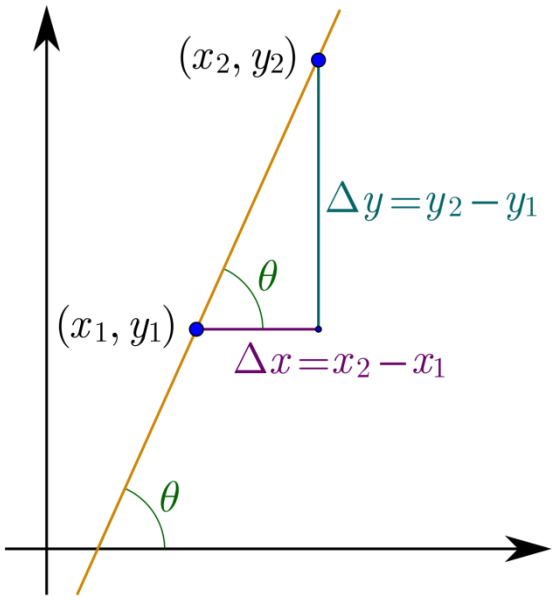
Clearly $\Delta AHP \sim \Delta PKB$

$$\therefore \frac{AP}{BP} = \frac{AH}{PK} = \frac{PH}{BK}$$

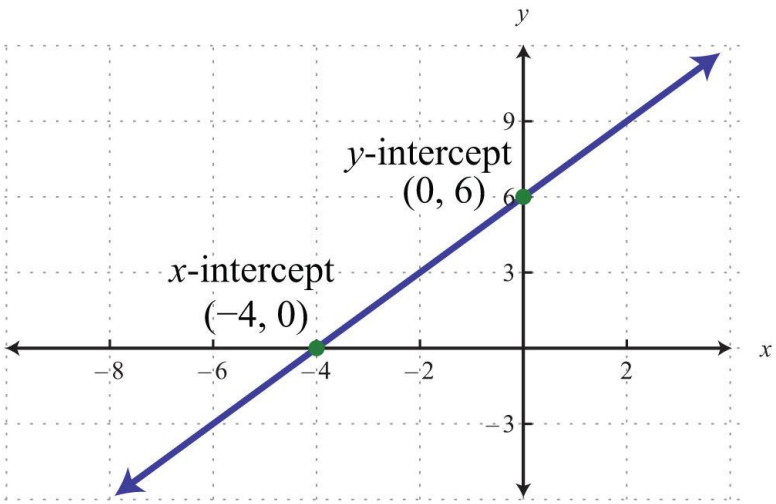
$$\therefore \frac{m}{n} = \frac{x - x_1}{x_2 - x} = \frac{y - y_1}{y_2 - y}$$

$$\therefore P \equiv \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right)$$





$$\text{Slope (m)} = \tan\theta = \frac{\text{change in y}}{\text{change in x}} = \frac{y_2 - y_1}{x_2 - x_1}$$



Intercept

X –intercept: where y is 0

Y – intercept: where x is 0

$$\text{Slope(m)} = \frac{\text{- y intercept}}{\text{xintercept}}$$

If equation of line is ax+by+c = 0 then slope of line = $\frac{-a}{b}$

Problem

Find the slope, x –intercept and y-intercept of a line x+3y = 63

Find the slope, x –intercept and y-intercept of a line x+3y = 63

For x-intercept put y =0

x+3×0= 63

⇨ x = 63

For y – intercept put x = 0

0+3y = 63

⇨ y = 21

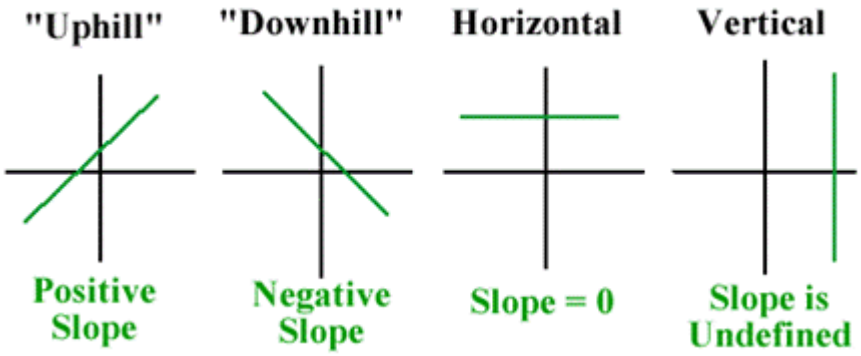
Slope = $\frac{-1}{3}$

If lines are || then their slopes are equal and reverse is also true.

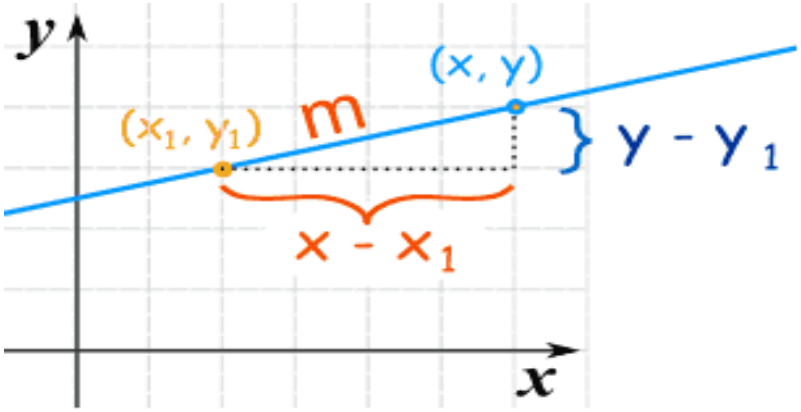
Example:
ax+by +c=0 & ax+by+d = 0

If 2 lines are ⊥ then product of their slopes is -1 i.e.

$m_1 \times m_2 = -1$



Equation of line



$$\frac{y - y_1}{x - x_1} = m$$

$$\frac{y - y_1}{x - x_1} = m(x - x_1)$$

$$y - y_1 = m(x - x_1)$$

Problem:

Lines l_1 and l_2 are parallel and equation of l_1 is $2x+9y=30$, then find the equation of l_2 if it passes through the point $(2,7)$?

Lines l_1 and l_2 are parallel and equation of l_1 is $2x+9y=30$, then find the equation of l_2 if it passes through the point (2,7)?

$$\text{Slope of } l_1 = \text{Slope of } l_2 = \frac{-2}{9}$$

Equation of line is $y-y_1=m(x-x_1)$

$$y-7=\frac{-2}{9}(x-2)$$

or

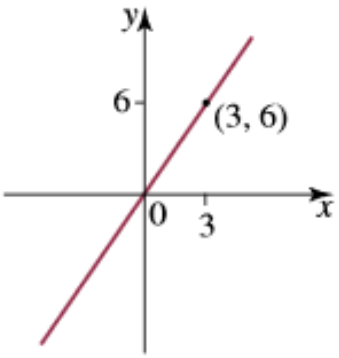
As we know only constant term is different in the equations of the || lines

Let equation of l_2 is $2x+9y=c$

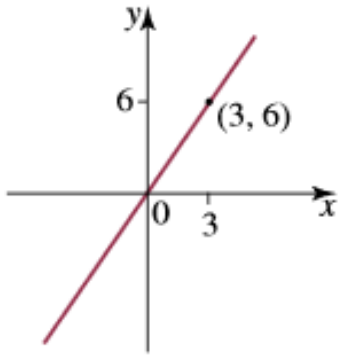
Since it is passing through the point (2,7) and therefore it has to saisfy the equation.

$2\times2+9\times7=c$

Problem: Find the equation of the given line?



Find the equation of the given line?



$$\frac{6-0}{3-0} = \frac{y-0}{x-0}$$

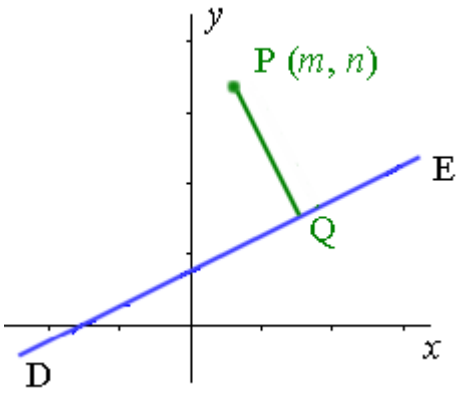
Perpendicular Distance between 2 || lines

Let equations of the lines are

$ax+by+c_1 = 0$ and $ax+by+c_2=0$

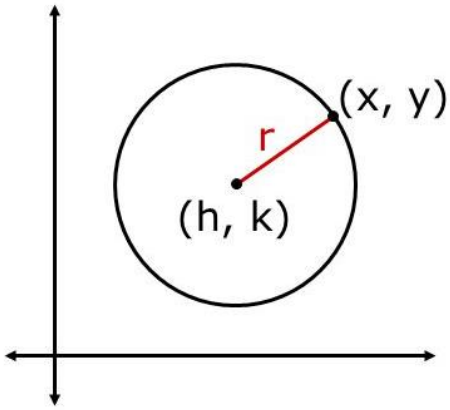
$$\text{Distance} = \frac{c_1 - c_2}{\sqrt{a^2+b^2}}$$

Perpendicular distance between appoint and line



Length of perpendicular to line DE with equation ax + by + c=0 from the point P(m,n) is

$$\frac{am+bn+c}{\sqrt{a^2+b^2}}$$



Use the Distance Formula to write this.

$$r = \sqrt{(x-h)^2 + (y-k)^2}$$

General equation of circle is $x^2+y^2+2fx+2gy+c = 0$

Center is (-f,-g) and radius $=\sqrt{f^2+g^2-c}$

Problem:

Find the radius and center of the circle if equation of circle is

$x^2+y^2+8x-10y-23 = 0$

$x^2+y^2+8x-10y-23 = 0$

$2f = 8, \Rightarrow f = 4$

$2g = -10 \Rightarrow g = -5$

Center(-4,5)

Radius = $\sqrt{4^2+5^2+23} = 8$