

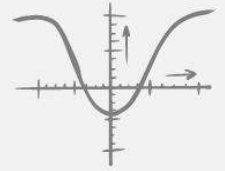
BRAVO

goals

$\int x$

$\frac{x}{y}$

\div



مقرر الرياضيات

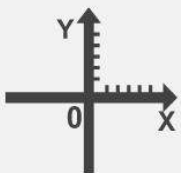
MATH-110

Appendix B

π

Coordinates geometry and lines

\sqrt{x}



fx

$|x|$

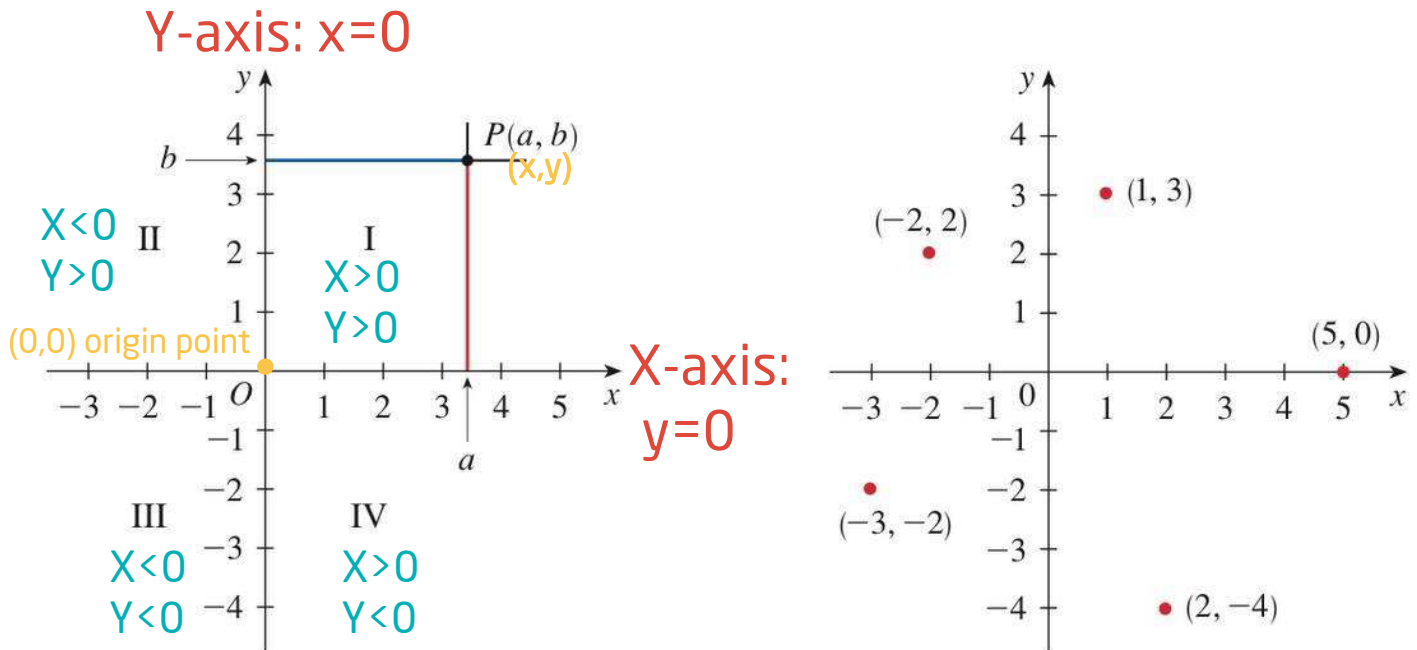
X_n

ابدأ التعلم الآن

Coordinate Geometry



XY plane or Cartesian plane:

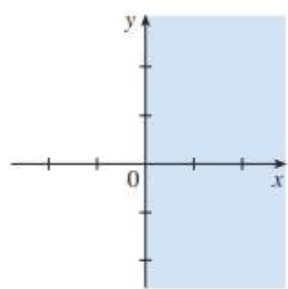


- (XY plane) or (Cartesian plane) or (Coordinate plane) is denoted by \mathbb{R}^2

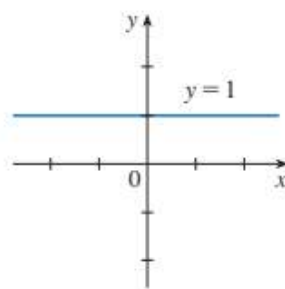
EXAMPLE 1:

Sketch the regions given by the following sets.

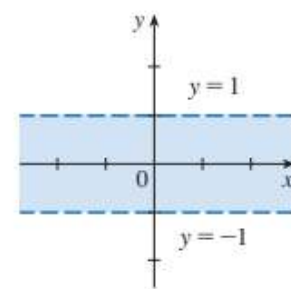
- (a) $\{(x, y) \mid x \geq 0\}$ (b) $\{(x, y) \mid y = 1\}$ (c) $\{(x, y) \mid |y| < 1\}$



(a) $x \geq 0$



(b) $y = 1$



(c) $|y| < 1$

$|y| < 1$ if and only if $-1 < y < 1$



Coordinate Geometry and Lines (continue)

1 Distance Formula The distance between the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ is

$$|P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

EXAMPLE 2:

The distance between $(1, -2)$ and $(5, 3)$ is

Solution:

$$\sqrt{(5 - 1)^2 + [3 - (-2)]^2} = \sqrt{4^2 + 5^2} = \sqrt{41}$$

2 Definition The **slope** of a nonvertical line that passes through the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ is

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

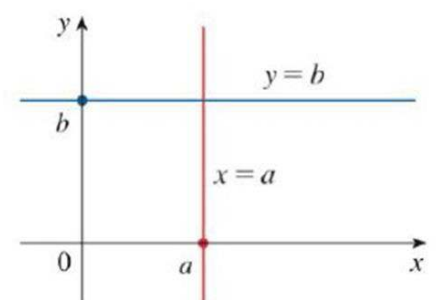
The slope of a vertical line is not defined.

NOTES:

- **Positive** slope \rightarrow **upward** to the right.
- **Negative** slope \rightarrow **downward** to the right.
- **Horizontal** line \rightarrow Parallel x axis \rightarrow slope **0** \rightarrow eq. $y=b$
- **Vertical** line \rightarrow Parallel y axis \rightarrow slope: Not defined \rightarrow eq. $x=a$

Parallel slope $\rightarrow m_1=m_2$

Perpendicular slope $\rightarrow m_2 = -\frac{1}{m_1}$



Lines (continue)

EXAMPLE:

Find the slope of line through $(1, -2)$ and $(5, 3)$?

Solution:

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-2)}{5 - 1} = \frac{3 + 2}{4} = \frac{5}{4}$$

3 Point-Slope Form of the Equation of a Line An equation of the line passing through the point $P_1(x_1, y_1)$ and having slope m is

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

EXAMPLE 3:

Find an equation of the line through $(1, -7)$ with slope $-\frac{1}{2}$.

Solution:

Using (3) with $m = -\frac{1}{2}$, $x_1 = 1$, and $y_1 = -7$, we obtain an equation of the line as

$$y + 7 = -\frac{1}{2}(x - 1)$$

which we can rewrite as

$$2y + 14 = -x + 1 \quad \text{or} \quad x + 2y + 13 = 0$$

EXAMPLE 4:

Find an equation of the line through the points $(-1, 2)$ and $(3, -4)$.

Solution:

Lines (continue)



4 Slope-Intercept Form of the Equation of a Line An equation of the line with slope m and y -intercept b is

$$y = mx + b$$

EXAMPLE:

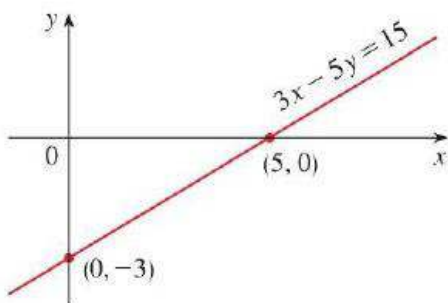
Find an equation of the line with slope 5 and y -intercept 7?

Solution:

EXAMPLE 5:

Sketch the graph of the equation $3x - 5y = 15$.

Solution:



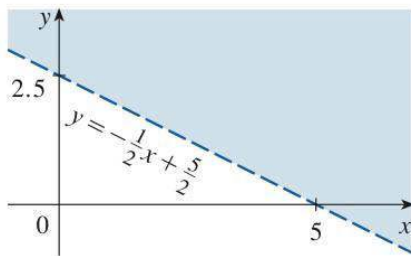
Lines (continue)



EXAMPLE 6:

Graph the inequality $x + 2y > 5$.

Solution:



EXAMPLE 7:

Find an equation of the line through the point $(5, 2)$ that is parallel to the line $4x + 6y + 5 = 0$.

Solution:



Lines (continue)

EXAMPLE 8:

Show that the lines $2x + 3y = 1$ and $6x - 4y - 1 = 0$ are perpendicular.

Solution:



تأكد دائمًا ان
#الدافور_معك!

The End

رابط المقرر:

<https://academic.bravome.net>

للتواصل:

<https://linktr.ee/emtenanayman>

