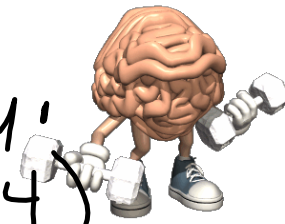
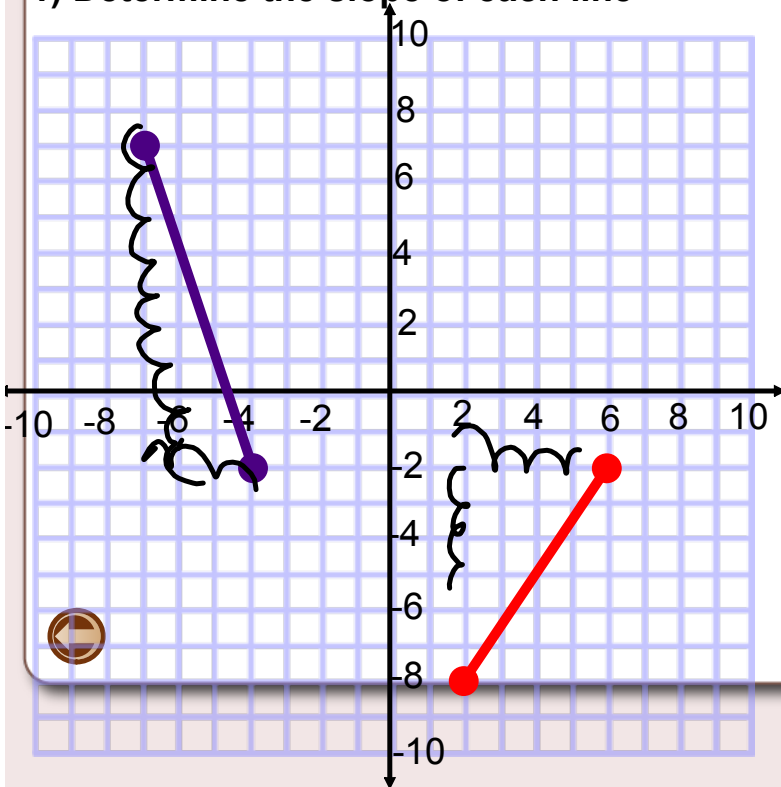


Warm Up

x_1, y_1
 $(-3, 4)$



1) Determine the slope of each line



2) What is the slope of a line with points $(-3, 4)$ and $(1, 2)$

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

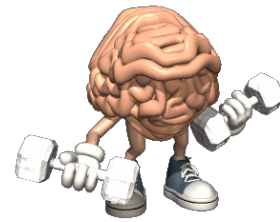
$$= \frac{2 - 4}{1 - (-3)}$$

$$= \frac{-2}{1 + 3}$$

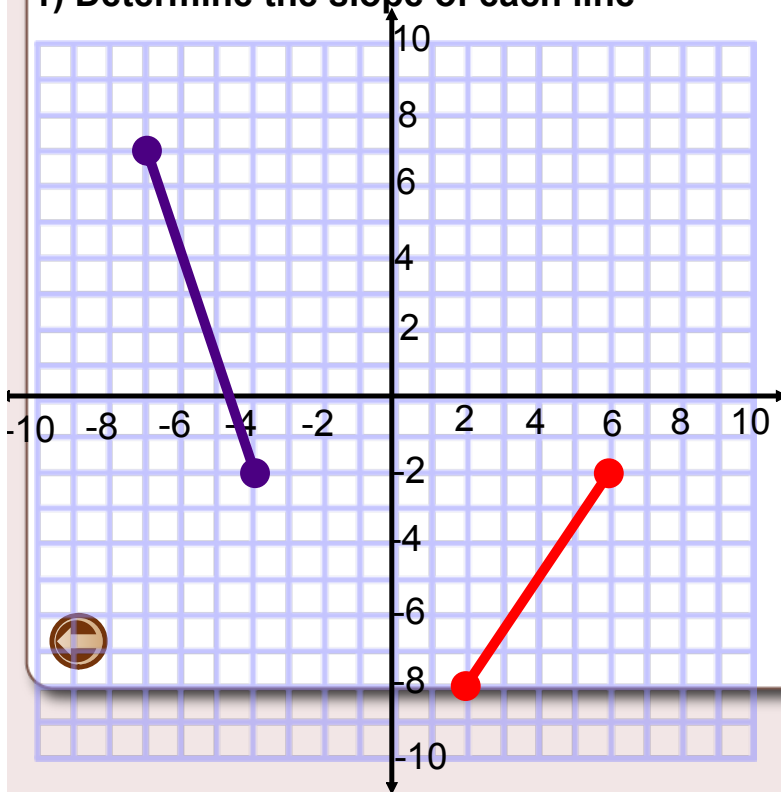
$$= \frac{-2}{4}$$

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

Warm Up



1) Determine the slope of each line

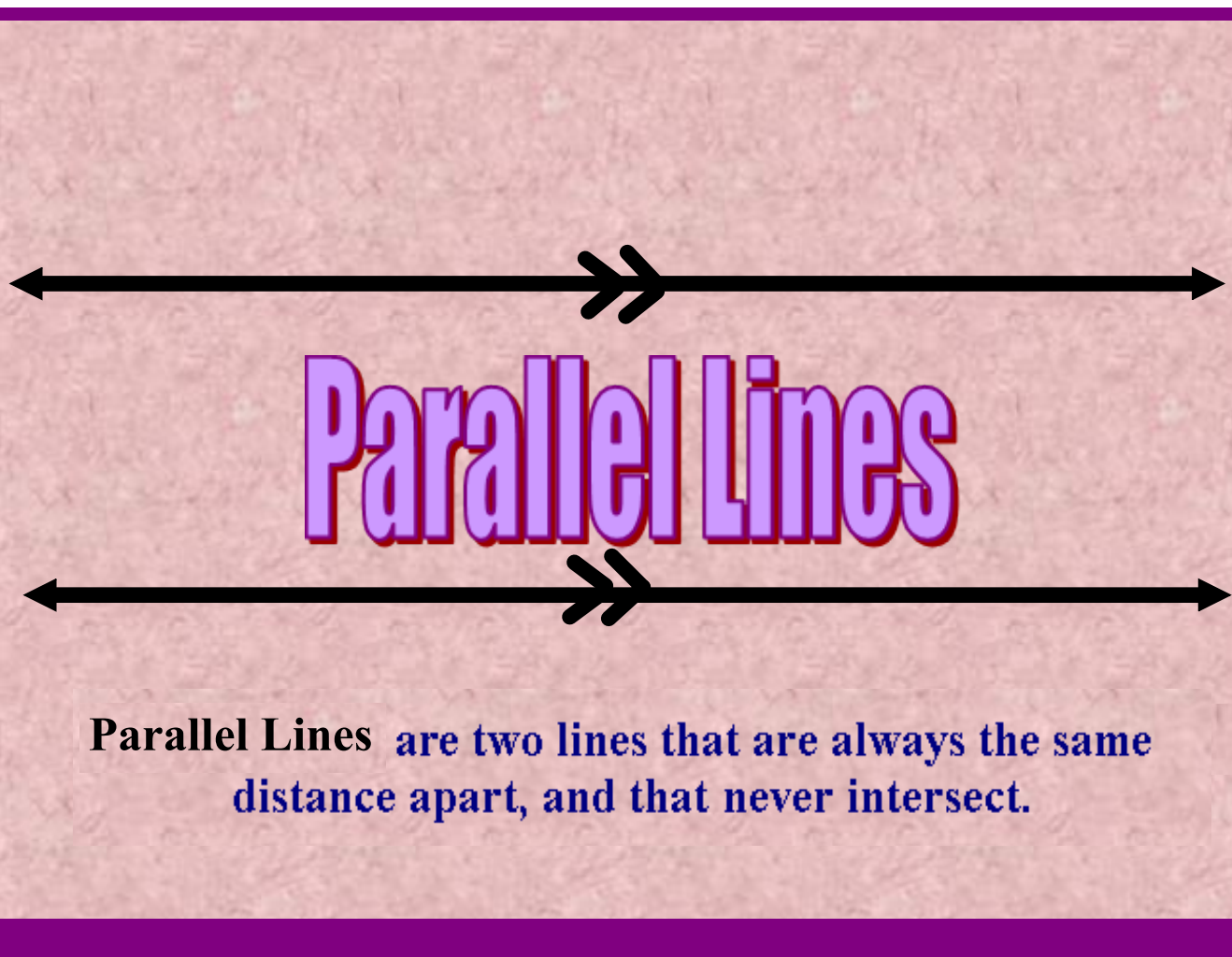


2) What is the slope of a line with points $(-3, 4)$ and $(11, -1)$?



Parallel & Perpendicular Lines & Collinear Points



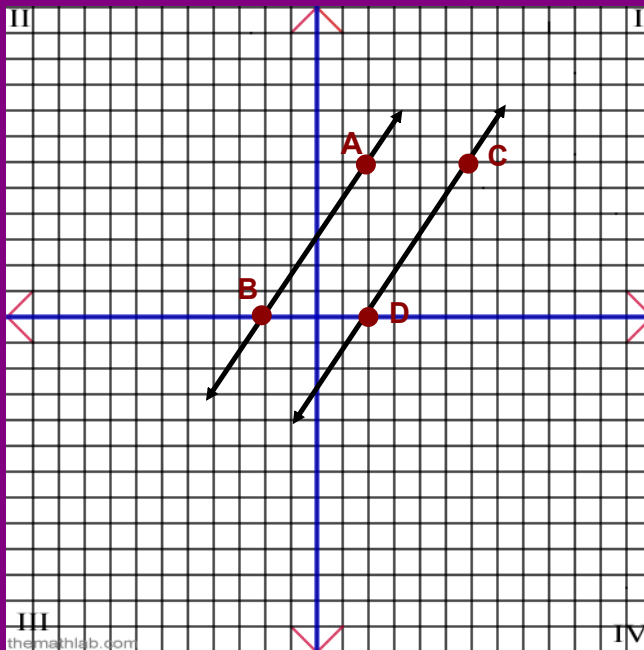


The diagram shows two horizontal black lines on a light pink textured background. Each line has a double arrow pointing to the right in the center, indicating they are parallel. The lines are equidistant and do not intersect.

Parallel Lines

Parallel Lines are two lines that are always the same distance apart, and that never intersect.

Parallel Lines



the-math-lab.com

Calculate the slope of
AB & DC

$\frac{1st}{x_1, y_1}$	$\frac{2nd}{x_2, y_2}$	$\frac{1st}{x_1, y_1}$	$\frac{2nd}{x_2, y_2}$
$(-2, 0)$	$(2, 6)$	$(2, 0)$	$(6, 6)$
$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$		$m_{DC} = \frac{y_2 - y_1}{x_2 - x_1}$	

What Do You Notice?

What Do You Notice?

$$\begin{array}{cc} \text{1st} & \text{2nd} \\ x_1, y_1 & x_2, y_2 \\ (-2, 0) & (2, 6) \end{array}$$

$$\begin{aligned} m_{AB} &= \\ \frac{6 - 0}{2 - (-2)} & \\ \frac{6}{4} & \\ = \frac{3}{2} & \end{aligned}$$

$$\begin{array}{cc} \text{1st} & \text{2nd} \\ x_1, y_1 & x_2, y_2 \\ (2, 0) & (6, 6) \end{array}$$

$$\begin{aligned} m_{DC} &= \\ \frac{6 - 0}{6 - 2} & \\ \frac{6}{4} & \\ = \frac{3}{2} & \end{aligned}$$

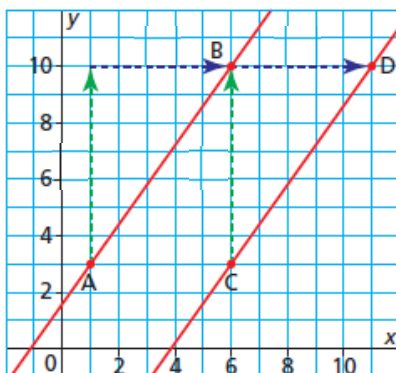


When two lines have the same slope, congruent triangles can be drawn to show the rise and the run.

Lines that have the same slope are parallel.

Slope of AB = ?

Slope of CD = ?



Recall:

$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

?



6.2 Slopes of Parallel and Perpendicular Lines

Slopes of parallel lines are equal

When given an equation $y = mx + b$

Two lines that are parallel will have the same "m"

Example: $y = 3x + 7$ & $y = 3x + 144$

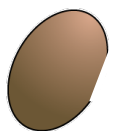
1) What is the slope of a line parallel to $y = 5x - 6$?

$$m = 5$$

2) What is the slope of a line parallel to $y = \frac{-6}{7}x - 10$?

$$m = -\frac{6}{7}$$

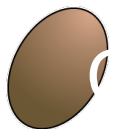
1 What is the slope of a line parallel to AB?



-2



$\frac{1}{2}$

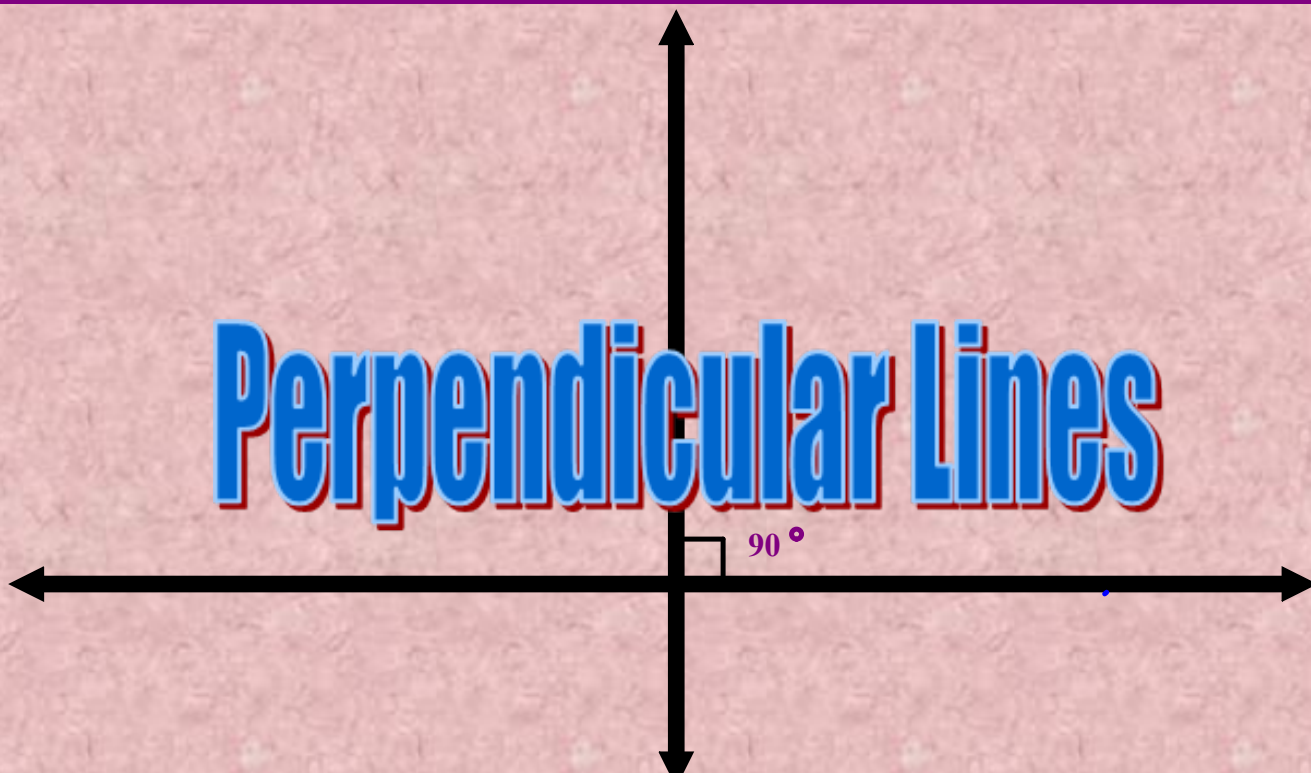


2

Slope of AB = 2



Perpendicular Lines

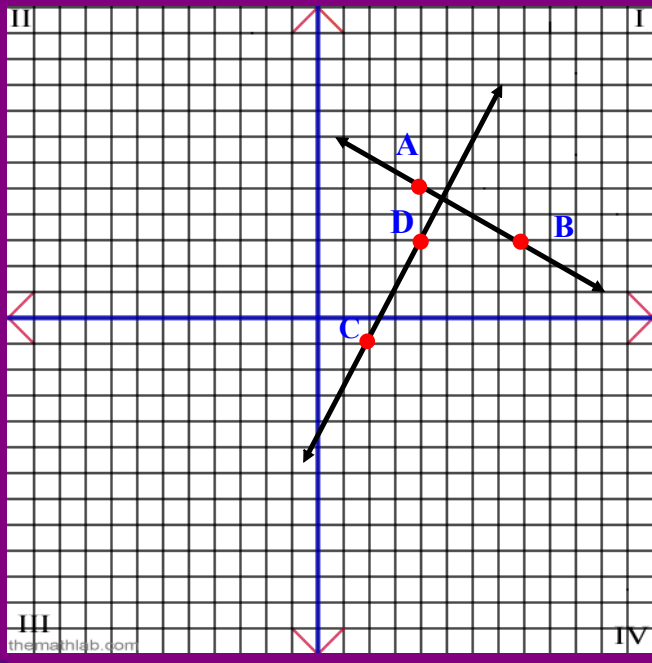


Perpendicular Lines are two lines that intersect to form a 90° angle. (Right Angle)

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Lines

Calculate the slope of
AB & DC



AB 1st (4, 5) 2nd (8, 3)

CD 1st (2, -1) 2nd (4, 3)

What Do You Notice?

Calculate the slope of
AB & DC

AB 1st (4, 5) 2nd (8, 3)

CD 1st (2, -1) 2nd (4, 3)

$$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{CD} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{AB} = \frac{3 - 5}{8 - 4}$$

$$m_{CD} = \frac{3 - (-1)}{4 - 2}$$

$$m_{AB} = \frac{-2}{4}$$

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

$$m_{CD} = \frac{4}{2}$$

$$m_{AB} = \frac{-1}{2}$$

$$m_{CD} = 2$$

What Do You Notice?

Therefore if the slopes of two lines are

OPPOSITE RECIPROCAL

we can say the lines are perpendicular

Therefore AB is perpendicular to DC

2 What is the slope of a line perpendicular to AB?



A

$$\frac{3}{4}$$

B

$$\frac{4}{3}$$

C

$$-\frac{3}{4}$$

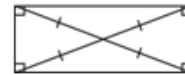


$$\text{Slope of AB} = -\frac{3}{4}$$

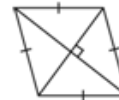


Activate Prior Learning: Properties of Quadrilaterals

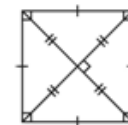
A **rectangle** is a parallelogram with 4 right angles. It has all the properties of a parallelogram and its diagonals are equal.



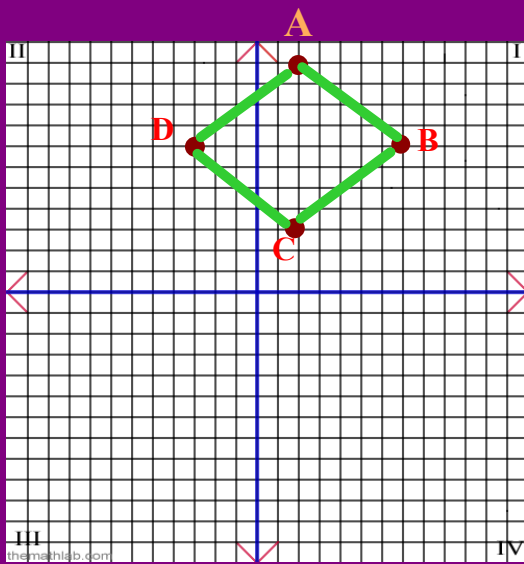
A **rhombus** is a parallelogram with 4 equal sides. It has all the properties of a parallelogram and its diagonals are perpendicular.



A **square** is a parallelogram with 4 equal sides and 4 right angles. A square has all the properties of a parallelogram, a rectangle, and a rhombus.



Determine whether or not the following figure is a rectangle.



A (2, 11) B (7, 7) C (2, 3) D (-3, 7)

$$m_{AB} = \frac{1}{5}$$

$$m_{AD} = \frac{5}{4}$$

$$m_{BC} = \frac{5}{4}$$

$$m_{CD} = \frac{4}{5}$$

No!

When given an equation $y = mx + b$

Two lines that are perpendicular when their slope are negative reciprocals "m" and $(-1/m)$

Example: $y = 3x + 7$ & $y = \underline{-1}x + 144$
3

1) What is the slope of a line Perpendicular to $y = 5x - 6$?

$$m = -\frac{1}{5}$$

2) What is the slope of a line perpendicular to $y = \frac{-6}{7}x - 10$?

$$m = \frac{7}{6}$$

Attachments

Parallel.doc

Perpendicular and Parallel lines.docx