

Algebra I

Notes Section 4.5

Write Equations of Parallel and Perpendicular Lines

Big Ideas

1. How to write an equation of a line parallel to a given line through a given point.
2. How to write an equation of a line perpendicular to a given line and through a given point.
3. How to determine which lines are parallel, perpendicular or neither based on their slope.

VOCABULARY

Slope of Parallel Lines: _____

Slope of Perpendicular Lines: _____

EXAMPLE 1 Write an equation of the line that passes through the given point and is parallel to the following line.

a) $(-3, -5)$ and $y = 3x - 1$

b) $(-3, 3)$ and $y = -2x + 1$

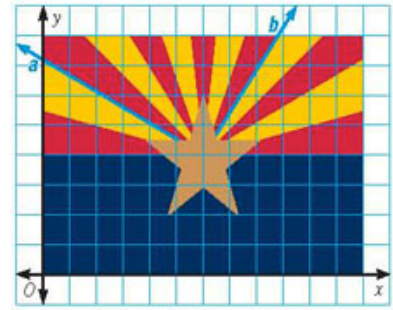
EXAMPLE 2 Determine which lines, if any, are parallel or perpendicular.

Line a: $y = 5x - 3$

Line b: $x + 5y = 2$

Line c: $-10y - 2x = 0$

EXAMPLE 3 The Arizona state flag is shown in a coordinate plane. Lines a and b appear to be perpendicular. Are they?



Line a: $12y = -7x + 42$

Line b: $11y = 16x - 52$

EXAMPLE 4 Write an equation of the line that passes through the following point and is perpendicular to the given line.

a) $(4, -5)$ and $y = 2x + 3$

b) $(4, -2)$ and $y = 4x + 2$