Linear Equations in Two Variables

The equation of a non-vertical line can be written in the form \( y = mx + b \), where \( m \) and \( b \) are real numbers.

Slope

<table>
<thead>
<tr>
<th>Parallel lines</th>
<th>Perpendicular lines</th>
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Equations of a line:

- Slope-intercept
- Point-slope
Ex 1:
   a) Find the slope of the line between (3,2) and (-7,-5).

   b) Find the equation of the line in part a.

Ex 2: Find the equation of the line with a slope of -3 and y-intercept (0,4).

Ex 3: For $4 - 5y + 7x = -10$, find the y-intercept and the slope.

Ex 4: Find the equation of a line through (4,-3) and (4,5).
Ex 5: Find the equation of the line through \((1,-5)\)

a) parallel to \(3x - 6y = 5\)

b) perpendicular to \(3x - 6y = 5\)

Ex 6: Water freezes at 32°F, which is 0°C. Water boils at 212°F which is the same as 100°C. Write a linear equation that fits these data.