

Mini-Lecture 1.3 Lines

Learning Objectives:

1. Calculate and interpret the slope of a line
2. Graph lines given a point and a slope
3. Find the equation of a vertical line
4. Use the point-slope form of a line; identify horizontal lines
5. Find the equation of a line, given two points
6. Write the equation of a line in slope-intercept form
7. Identify slope and y -intercept of a line from its equation
8. Graph lines written in general form using intercepts
9. Find equations of parallel lines
10. Find equations of perpendicular lines

Examples:

1. Determine the slope of the line containing the points $(-5,4)$ and $(0,7)$.
2. Graph the line containing the point $(2,4)$ with slope $m = \frac{-2}{3}$.
3. Write an equation of the line satisfying the given conditions:
 - (a) Slope = $\frac{3}{4}$, containing the point $(-2,4)$.
 - (b) Containing the points $(4,2)$ and $(3,-4)$.
 - (c) x -intercept = 3, y -intercept = -2.
 - (d) Vertical line containing $(5,-1)$.
 - (e) Parallel to the line $3x - 4y = 5$ and containing the point $(3,-6)$.
4. Find the slope and y -intercept of the line $4x - 6y = -3$.
5. Find the intercepts and graph the line $-2x + y = 4$.

Teaching Notes:

- This material is not usually hard for the students.
- When finding the slope, make sure they don't reverse the x - and y -values.
- They should learn the various forms for the equation of a line and be comfortable solving standard form for y .
- Simplifying the equations should be emphasized.

Answers: 1. $m = \frac{7-4}{0-(-5)} = \frac{3}{5}$ 3. (a) $y = \frac{3}{4}x + \frac{11}{2}$

3. (b) $y = 6x - 22$ (c) $y = \frac{2}{3}x - 2$ (d) $x = 5$ (e) $y = \frac{3}{4}x - \frac{33}{4}$

4. Slope = $\frac{2}{3}$; y -intercept = $\frac{1}{2}$ 5. x -intercept = -2, y -intercept = 4

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