

Problem 4.3

A Consider the two groups of lines shown below.

Group 1 $y = 3x$ $y = 5 + 3x$ $y = 10 + 3x$ $y = -5 + 3x$

Group 2 $y = -2x$ $y = 4 - 2x$ $y = 8 - 2x$ $y = -4 - 2x$

1. What features do the equations in each group have in common?
2. For each group, graph the equations on the same coordinate axes. What patterns do you observe in the graphs?
3. Describe another group of lines that have the same pattern.

B Consider the three pairs of lines shown below.

Pair 1

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

Pair 2

$$y = 4x$$
$$y = -0.25x$$

Pair 3

$$y = -3x + 5$$
$$y = \frac{1}{3}x - 1$$

1. What features do the equations in each pair have in common?
2. For each pair, graph both equations on the same coordinate axes. What patterns do you observe in the graphs?
3. Describe another pair of lines that have the same pattern.

C Consider the three pairs of lines shown below.

Pair 1

$$y = 2x + 1$$
$$y = 2(x + 1) - 1$$

Pair 2

$$y = 5 - 2x$$
$$y = 3 - 2(x - 1)$$

Pair 3

$$y = 2(x - 1)$$
$$y = 4x - 2x - 2$$

1. For each pair, graph both equations on the same coordinate axes.
2. What do you notice about the graphs of each pair of equations? How might you have predicted this from the equations?