Warm-up Sept. 12

Find the linear equation of the given segments.

1) RQ: $y = -\frac{1}{2}x - 5$

x	y
R(−6,	−2)
Q(−4,	−3)

$m = \frac{-2 - (-3)}{-6 - (-4)}$

$m = \frac{1}{-2}$ ← slope

$y = mx + b$ (−4, −3)

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

$-3 = 2 + b$

$-2 \quad -2$

$-5 = b$ ← y-intercept

2) NM: $y = \frac{1}{6}x - \frac{8}{3}$

N(4, −2)

M(10, −1) $m = \frac{-1 - (-2)}{10 - 4}$

$m = \frac{1}{6}$ ← slope

$y = mx + b$

$-1 = \frac{1}{6}(10) + b$

$-\frac{6}{6} = \frac{10}{6} + b$

$-\frac{16}{6} \quad -\frac{10}{6}$

$-\frac{16}{6} = b$

simplify $-\frac{8}{3}$

3) QP: $y = -3$

Q	x	y
(−4,		−3)
P(1,		−3)

↑ the same

$m = \frac{-3 - (-3)}{1 - (-4)} = \frac{0}{5}$

zero slope

horizontal line

4) RS: $x = -6$

	x	y
R(−6,		−2)
S(−6,		−7)

↑ the same

$m = \frac{-2 - (-7)}{-6 - (-6)} = \frac{5}{0}$

undefined

no slope

vertical line

Example 3: Write an equation of a line from a table of values.

x	y
-1	6
1	2
5	-6
7	-10

+2 → -4, +4 → -8, +2 → -4

$m = \frac{\Delta y}{\Delta x} = \frac{-4}{2} = -2$

or

$m = \frac{\Delta y}{\Delta x} = \frac{-8}{4} = -2$

same slope

$y = mx + b$

$2 = -2(1) + b$

$2 = -2 + b$

$+2 \quad +2$

$4 = b$

Steps

1. Instead of using the slope formula, find the pattern of the values in the x and y columns. This is the slope,

$m = \frac{\text{pattern in the y - values}}{\text{pattern in the x - valus}}$

Follow steps 2 & 3 from example 1

Linear Equation: $y = -2x + 4$

Example 4: Write an equation if all you know is the slope and one point on the line:

Write an equation of a line that has a slope of $\frac{1}{2}$ and passes through (-4, 2).

x y

Steps

1. Substitute the slope (m) and the point (x_1, y_1) into "Point-slope" form: $y - y_1 = m(x - x_1)$
2. Distribute to get rid of the parentheses on the right side of the equation.
3. Solve for y and your equation will be in slope-intercept form.

$y - y_1 = m(x - x_1)$

$y - 2 = \frac{1}{2}(x + 4)$

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

$+2 \qquad +2$

$y = \frac{1}{2}x + 4$

Linear Equation: $y = \frac{1}{2}x + 4$