

Parallel & Perpendicular

- horizontal line: $y = \#$ (slope is zero)
- vertical line: $x = \#$ (undefined slope)
→ cannot divide by zero
- parallel: lines w/ the same slope (\parallel)
- perpendicular: lines w/ opposite reciprocal slopes (\perp)
ex. -2 & $\frac{1}{2}$

examples

1. Write a SIF parallel to $y = 2x - 4$ through $(4, -1)$

$$y = 2x + b$$

$$-1 = 2(4) + b$$

$$-1 = 8 + b$$

$$-9 = b$$

$$y = 2x - 9$$

2. Write a SIF parallel to x -axis through $(-3, 5)$

Slope = 0

$$y = 5$$

3. Write a SIF \perp to $2x + 3y = 12$ through $(-4, 6)$

$$3y = 12 - 2x$$

$$y = 4 - \frac{2}{3}x$$

$$y = \frac{3}{2}x + b$$

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

$$6 = -6 + b$$

$$12 = b$$

$$y = \frac{3}{2}x + 12$$

4. Decide whether the lines are parallel, \perp or neither

$$-2x + y = 9 \quad \& \quad 6x + 12y = 24$$

$$y = 9 + 2x$$

$$12y = 24 - 6x$$

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

$$\perp$$

5. Two beams \overline{QR} & \overline{ST} are used for building. When put down the coordinates are $Q(-6, 2)$, $R(-1, 8)$, $S(-3, 6)$ & $T(-8, 5)$. Are the beams \perp ?

$$\overline{QR} = \frac{8-2}{-1+6} = \frac{6}{5}$$

$$\overline{ST} = \frac{6-5}{-3+8} = \frac{1}{5}$$

no

6. Write a SIF \perp to $y = \frac{1}{3}x + 6$ through $(-4, 5)$