# SEC 2.4 LINES

1. SLOPE: $\frac{\text{RISE}}{\text{RUN}} = \frac{\text{VERTICAL CHANGE}}{\text{HORIZONTAL CHANGE}} =$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

EXAMPLE: $P(2,1)$ $Q(8,5)$

$$m = \frac{5-1}{8-2} \quad \frac{4}{6} = \frac{2}{3}$$

2. POINT-SLOPE FORM

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

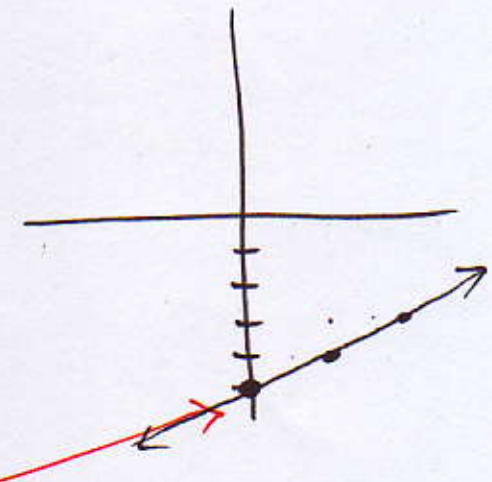
Ex. $m = \frac{1}{2}$ $P(4,-3)$

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

$$y + 3 = \frac{1}{2}x - 2$$

$-3$ $-3$

$$\boxed{y = \frac{1}{2}x - 5}$$



3. SLOPE - INTERCEPT FORM

$$y = mx + b$$

SLOPE  y-INTERCEPT

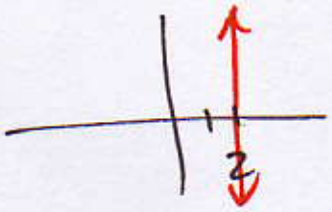
$m = \frac{1}{3}$  $b = \frac{2}{5}$

SLOPE  y-INT.

$$y = \frac{1}{3}x + \frac{2}{5}$$

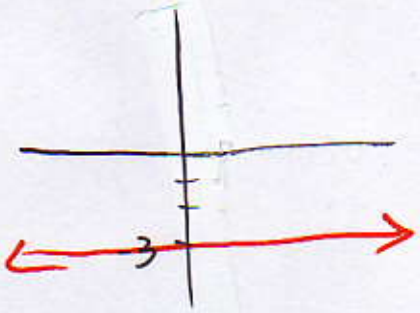
4. VERTICAL LINE  $x = a$

$x = 2$




5. HORIZONTAL LINE  $y = b$

$y = -3$




6. GENERAL FORM

$$Ax + By + C = 0$$

## 7. PARALLEL LINES

TWO NON-VERTICAL LINES ARE PARALLEL IF AND ONLY IF THEY HAVE THE SAME SLOPE.

EX $y = \frac{3}{5}x + 1$ ← SAME SLOPE

$y = \frac{3}{5}x - 2$

## 8. PERPENDICULAR LINES

TWO LINES ARE PERPENDICULAR IF AND ONLY IF $m_1 \cdot m_2 = -1$

EX. $7 \cdot -\frac{1}{7} = -1$

$-\frac{2}{3} \cdot \frac{3}{2} = -1$

OPPOSITE RECIPROCALS

## 9. RATE OF CHANGE AS A SLOPE.

$$\frac{120 \text{ miles}}{5 \text{ gallons}} = \frac{24 \text{ mile}}{1 \text{ gallon}}$$

DENOMINATOR SIMPLIES TO A 1.