

### 2.3 Practice Problems

Directions: Find the slope of the line passing through the given points. Then tell whether the line rises, falls, is horizontal or is vertical.

1) (2, -4), (4, -1)

$$\frac{-1 - (-4)}{4 - 2} = \frac{3}{2} \quad \boxed{\text{rises}}$$

2) (-3, -2), (3, -2)

$$\frac{-2 - (-2)}{3 - (-3)} = \frac{0}{6} = 0$$

$\boxed{\text{horizontal}}$

3) (-1, 4), (1, -4)

$$\frac{-4 - 4}{1 - (-1)} = \frac{-8}{2} = -4$$

$\boxed{\text{falls}}$

4) (5, 5), (7, 3)

$$\frac{3 - 5}{7 - 5} = \frac{-2}{2} = -1$$

$\boxed{\text{falls}}$

5) (4, 4), (4, 9)

$$\frac{9 - 4}{4 - 4} = \frac{5}{0} = \text{undefined}$$

$\boxed{\text{vertical}}$

6) (8, 9), (-4, 3)

$$\frac{3 - 9}{-4 - 8} = \frac{-6}{-12} = \frac{1}{2}$$

$\boxed{\text{rises}}$

7) (-4.2, 0.1), (-3.2, 0.1)

$$\frac{.1 - .1}{-3.2 - (-4.2)} = \frac{0}{1} = 0$$

$\boxed{\text{horizontal}}$

8)  $(-\frac{1}{2}, \frac{5}{2}), (\frac{5}{2}, 3)$

$$\frac{\frac{5}{2} - \frac{5}{2}}{\frac{5}{2} - (-\frac{1}{2})} = \frac{0}{\frac{6}{2}} = 0$$

$\boxed{\text{horizontal}}$

9)  $(\frac{7}{3}, \frac{4}{5}), (\frac{7}{3}, \frac{9}{5})$

$$\frac{\frac{9}{5} - \frac{4}{5}}{\frac{7}{3} - \frac{7}{3}} = \frac{\frac{5}{5}}{0} = \text{undefined}$$

$\boxed{\text{vertical}}$

Directions: Describe and correct the error in finding the slope of the line passing through the given points.

10)

(-4, -3), (2, -1)

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

$\frac{-1 - (-3)}{2 - (-4)} = \frac{2}{6} = \frac{1}{3}$

11)

(-1, 4), (5, 1)

$$m = \frac{5 - (-1)}{1 - 4} = -2$$

Put  $\Delta x$  on top and  $\Delta y$  on bottom

$$\frac{1 - 4}{5 - (-1)} = \frac{-3}{6} = -\frac{1}{2}$$

Directions: Tell whether the lines are parallel, perpendicular or neither.

12) Line 1: Through (3, -1) and (6, -4)

Line 2: Through (-4, 5) and (-2, 7)

$$m_1 = \frac{-4 - (-1)}{6 - 3} = \frac{-3}{3} = -1$$

$$m_2 = \frac{7 - 5}{-2 - (-4)} = \frac{2}{2} = 1$$

-1 and 1 are neg. reciprocals.

$\boxed{\text{Line 1 and Line 2 are perpendicular.}}$

13) Line 1: Through (-3, 2) and (5, 0)

Line 2: Through (-1, -4) and (3, -3)

$$m_1 = \frac{0-2}{5-(-3)} = \frac{-2}{8} = -\frac{1}{4} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} m_2 = \frac{-3-(-4)}{3-(-1)} = \frac{1}{4}$$

NEITHER

14) Line 1: Through (-1, 4) and (2, 5)

Line 2: Through (-6, 2) and (0, 4)

$$m_1 = \frac{5-4}{2-(-1)} = \frac{1}{3} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} m_2 = \frac{4-2}{0-(-6)} = \frac{2}{6} = \frac{1}{3}$$

$m_1 = m_2$   
SO PARALLEL

Directions: Find the average rate of change for each situation.

15) Red Cross raises \$250 after 2 hours and \$785 after 6 hours. What's the average rate of change in terms of dollars per hour?

$$\frac{250-785}{2-6} = \frac{-535}{-4} = \frac{\$}{\text{hr}} = \boxed{\$133.75 \text{ per hour}}$$

16) At the beginning of practice the football team has a 10 liter jug of water. After 30 minutes there are 3 liters left. What's the average rate of change in terms of liters per minute?

$$\frac{3-10}{30-0} = \frac{-7}{30} = \frac{\text{Liters}}{\text{min}} = \boxed{-0.23 \text{ liters per min}}$$

17) Mr. Brust goes to the mall with \$200 in his wallet and after 20 minutes he has \$40 left in his wallet. What's the average rate of change in terms of dollars per minute spending?

$$\frac{40-200}{20-0} = \frac{-160}{20} = \frac{\$}{\text{min}} = -8 \$ \text{ per min.}$$

18) In one hour RHS has raised \$40 for prom, and after 8 hours RHS has still only raised \$40 for prom. What's the average rate of change in terms of dollars per hour fundraising?

$$\frac{40-40}{8-1} = \frac{0}{7} = \frac{\$}{\text{hr}} = \boxed{\$0 \text{ per hour}}$$