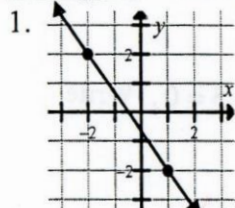


LESSON 1-1 SLOPES, LINES, CALCULATOR REVIEW

The slope of a line is symbolized by the letter "m".

$$\text{Slope} = m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

Examples: Find the slopes of the lines containing each pair of points.



$$m = -\frac{4}{3}$$

1. $(-2, 0)$ and $(4, 2)$

$$m = \frac{2-0}{4-(-2)} = \frac{2}{6} = \frac{1}{3}$$

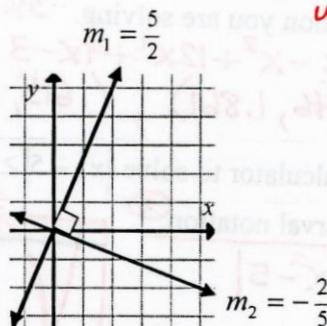
2. $(3, 2)$ and $(2, 2)$

$$m = \frac{2-2}{2-3} = 0$$

3. $(3, 2)$ and $(3, 5)$

$$m = \frac{5-2}{3-3}$$

undefined



Parallel lines have equal slopes ($m_1 = m_2$).

Perpendicular lines have slopes which are

opposite reciprocals ($m_1 = -\frac{1}{m_2}$).

Equations for lines

point-slope form: $y - y_1 = m(x - x_1)$

slope-intercept form: $y = mx + b$ (where b is the y-intercept)

general form: $Ax + By + C = 0$ (where A , B , and C are integers)

Examples: Find an equation of each line described.

5. a line through $(2, 3)$ with slope $m = -3$

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

6. a vertical line through $(-1, 2)$

$$x = -1$$

7. a line through $(-1, 2)$ parallel to the graph of $2x - 5y = 5$ (in slope-intercept form)

$$\begin{aligned} \textcircled{1} -5y &= 5 - 2x \\ y &= -1 + \frac{2}{5}x \\ m_1 &= \frac{2}{5} \end{aligned}$$

$$\begin{aligned} \textcircled{2} m_2 &= \frac{2}{5} \\ y - 2 &= \frac{2}{5}(x + 1) \\ \textcircled{3} y &= \frac{2}{5}x + \frac{2}{5} + 2 \\ &\text{or } y = \frac{2}{5}x + 2\frac{2}{5} \end{aligned}$$

8. a line through $(-1, 2)$ perpendicular to the graph of $2x - 5y = 5$ (in general form)

$$\begin{aligned} \textcircled{1} m_1 &= \frac{2}{5} \\ m_2 &= -\frac{5}{2} \end{aligned}$$

$$\textcircled{2} y - 2 = -\frac{5}{2}(x + 1)$$

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

$$2y - 4 = -5x - 5$$

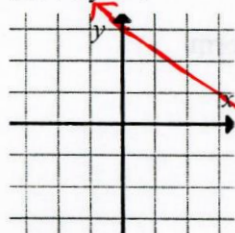
$$5x + 2y + 1 = 0$$

$$\text{or } -5x - 2y - 1 = 0$$

mult. by 2

Examples: Draw a graph of each line.

9. $2x + 3y = 9$

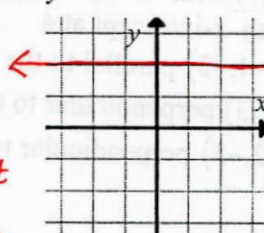


METHOD 1
(Find 2 intercepts)
 $0 + 3y = 9$ $2x + 0 = 9$
 $y = 3$ $x = 4.5$

METHOD 2
(Put into slope-intercept form)

$$\begin{aligned} 3y &= -2x + 9 & m &= -\frac{2}{3} \\ y &= -\frac{2}{3}x + 3 & b &= 3 \end{aligned}$$

10. $y = 2$



horizontal line
 $y = \underline{\quad}$

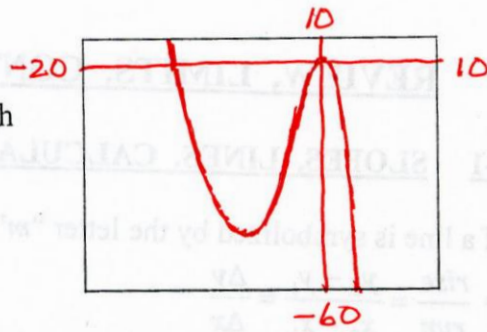
Calculator Examples:

11. Find a window to show a complete graph

$$\text{of } y = f(x) = -0.2x^3 - 2.2x^2 + 1.6x + 1.$$

Indicate the scale on the graph or give your window setting.

$$[-20, 10] \text{ by } [-60, 10]$$



12. Find the zeros of $y = f(x) = -0.2x^3 - 2.2x^2 + 1.6x + 1.$

$$f(x) = 0$$

$$x = -11.649 \text{ or } -11.650, x = -.406, x = 1.056$$

13. Find the points of intersection of $y = -x^3 + 12x^2 + 9x - 3$ and $3x - y + 5 = 0$. Write the equation you are solving. $3x - y + 5 = 0 \rightarrow y = 3x + 5$

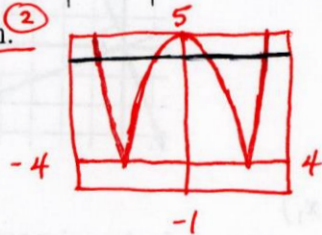
$$\text{Equation: } -x^3 + 12x^2 + 9x - 3 = 3x + 5$$

$$(-1.046, 1.861), (.615, 6.845), (12.430, 42.292)$$

14. Use a calculator to solve $|x^2 - 5| \geq 4$. Write your answer in both inequality notation ① and interval notation. ②

$$y_1 = |x^2 - 5|$$

$$y_2 = 4$$



Intersections at $x = -3, -1, 1, 3$

$y_1 \geq y_2$ for:

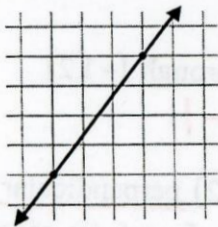
$$x \leq -3, -1 \leq x \leq 1, x \geq 3 \quad \text{①}$$

$$(-\infty, -3], [-1, 1], [3, \infty) \quad \text{②}$$

ASSIGNMENT 1-1

Find the slopes of these lines.

1.



2. through $(2, -6)$ and $(5, -12)$

3. through $(3, 6)$ and $(-2, 6)$

4. through $(-6, 5)$ and $(4, 3)$

Find an equation for each line.

5. through $(1, 2)$ with $m = -2$

6. through $(2, 0)$ and $(3, 1)$, in slope-intercept form

7. through $(1, 7)$ with undefined slope

8. through $(1, 7)$ with $m = 0$

9. vertical with x -intercept at 4

10. through $(-1, -3)$ parallel to the graph of $y = 3x - 5$, in general form

11. through $(2, 3)$ perpendicular to the graph of $2x - 3y = 7$

12. through $(2, -3)$ perpendicular to the graph of $x = 5$