Before Class:

☐ Read the objectives on page 202.

☐ Read the Helpful Hint boxes on pages 203, 204, 205, 208, and 210.

☐ Complete the exercises:

1. Does the slope of a line depend on which two points on the line are used in the calculation of the slope?

2. To decide whether a line “goes up” or “goes down,” always follow the line from ___________________________ to ___________________________.

3. Write the general slope-intercept form of the equation of a line.

4. Two lines that lie in the same plane and meet at a 90° angle are ___________________________.

During Class:

☐ Write your class notes. Neatly write down all examples shown as well as key terms or phrases with definitions. If not applicable or if you were absent, watch the Lecture Series (DVD) for this section and do the same (write down the examples shown as well as key terms or phrases). Insert more paper as needed.

<table>
<thead>
<tr>
<th>Class Notes/Examples</th>
<th>Your Notes</th>
</tr>
</thead>
</table>

Answers: 1) no 2) left; right 3) $y = mx + b$ 4) perpendicular
Section 3.4 Slope and Rate of Change

Practice:

☐ Complete the Vocabulary and Readiness Check on page 213.

☐ Next, complete any incomplete exercises below. Check and correct your work using the answers and references at the end of this section.

Review this example:

1. Find the slope of the line through \((-1,5)\) and \((2,-3)\). Graph the line.

If we let \((x_1,y_1)\) be \((-1,5)\), and \((x_2,y_2)\) be \((2,-3)\), then, by the definition of slope,

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 5}{2 - (-1)} = \frac{-8}{3} = \frac{-8}{3}
\]

The slope of the line is \(\frac{-8}{3}\).

Your turn:

2. Find the slope of the line that passes through \((-1,5)\) and \((6,-2)\).

Review this example:

3. Find the slope and the \(y\)-intercept of the line whose equation is \(3x - 4y = 4\).

Write the equation in slope-intercept form by solving for \(y\).

\[
3x - 4y = 4 \\
-4y = -3x + 4 \\
\frac{-4y}{-4} = \frac{-3x + 4}{-4} \\
y = \frac{3}{4}x - 1
\]

The coefficient of \(x\), \(\frac{3}{4}\), is the slope, and the \(y\)-intercept is \((0,-1)\).

Your turn:

4. Find the slope of the line \(2x - 3y = 10\).
Review this example:
5. Find the slope of the line \( x = 5 \).

The graph of \( x = 5 \) is a vertical line with \( x \)-intercept \((5,0)\). To find the slope, find two ordered pair solutions of \( x = 5 \). The solution must have an \( x \)-value of 5. Let’s use points \((5,0)\) and \((5,4)\), which are on the line.

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 0}{5 - 5} = \frac{4}{0}
\]

Since \( \frac{4}{0} \) is undefined, the slope of the line \( x = 5 \) is undefined.

Your turn:
6. Find the slope of the line \( y = -3 \).

Review this example:
7. Determine whether the pair of lines is parallel, perpendicular, or neither.

\[
y = -\frac{1}{5}x + 1
\]

\[
2x + 10y = 3
\]

The slope of the line \( y = -\frac{1}{5}x + 1 \) is \( -\frac{1}{5} \). Find the slope of the second line by solving its equation for \( y \).

\[
2x + 10y = 3
\]

\[
10y = -2x + 3
\]

\[
y = -\frac{2}{10}x + \frac{3}{10}
\]

\[
y = -\frac{1}{5}x + \frac{3}{10}
\]

The slope of this line is \( -\frac{1}{5} \) also. Since the lines have the same slope and different \( y \)-intercepts, they are parallel.

Your turn:
8. Determine whether the pair of lines is parallel, perpendicular, or neither.

\[
y = \frac{2}{9}x + 3
\]

\[
y = -\frac{2}{9}x
\]
Review this example:
9. The following graph shows the cost \( y \) (in cents) of a nationwide long-distance telephone call from Texas with a certain telephone-calling plan, where \( x \) is the length of the call in minutes. Find the slope of the line and attach the proper units for the rate of change. Then write a sentence explaining the meaning of slope in this application.

Use \((2,34)\) and \((6,62)\) to calculate slope.

\[
m = \frac{62 - 34}{6 - 2} = \frac{28}{4} = 7 \text{ cents per minute}
\]

This means that the rate of change of a phone call is 7 cents per 1 minute or the cost of the phone call is 7 cents per minute.

Your turn:
10. Find the slope of the line and write the slope as a rate of change. Don’t forget the proper units.

The graph shows the total cost \( y \) (in dollars) of owning and operating a compact car where \( x \) is the number of miles driven.
Section 3.4 Slope and Rate of Change

<table>
<thead>
<tr>
<th>Answer</th>
<th>Text Ref</th>
<th>Video Ref</th>
<th>Answer</th>
<th>Text Ref</th>
<th>Video Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-\frac{8}{3}); ((-1, 5))</td>
<td>Ex 1, p. 204</td>
<td></td>
<td>6 (m = 0)</td>
<td></td>
<td>Sec 3.4, Ex 49</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-1)</td>
<td>Sec 3.4, Ex 1</td>
<td></td>
<td>7 parallel</td>
<td></td>
<td>Ex 9a, p. 210</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m = \frac{3}{4}; (0, -1))</td>
<td>Ex 6, p. 207</td>
<td></td>
<td>8 neither</td>
<td></td>
<td>Sec 3.4, Ex 55</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m = \frac{2}{3})</td>
<td>Sec 3.4, Ex 43</td>
<td></td>
<td>9 (m = 7); The cost of the phone call is 7 cents per minute.</td>
<td></td>
<td>Ex 11, p. 212</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>undefined</td>
<td>Ex 8, p. 208</td>
<td></td>
<td>10 (m = 0.42); It costs $0.42 per mile to own and operate a compact car.</td>
<td></td>
<td>Sec 3.4, Ex 73</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Next, insert your homework. Make sure you attempt all exercises asked of you and show all work, as in the exercises above. Check your answers if possible. Clearly mark any exercises you were unable to correctly complete so that you may ask questions later. DO NOT ERASE YOUR INCORRECT WORK. THIS IS HOW WE UNDERSTAND AND EXPLAIN TO YOU YOUR ERRORS.