So far, we have been writing equations in slope-intercept form:

**Slope-Intercept Form: __________________________**

\[(m \text{ is the } \underline{________} \text{ and } b \text{ is the } \underline{________})\]

**Ex 1:** Write the equation of the line with a slope of 3 and a y-intercept of -6 in slope-intercept form.

Write slope-intercept form:

Substitute \(m\) and \(b\):

There is another way to write an equation:

**Point-Slope Form: __________________________**

\[(m \text{ is the } \underline{________} \text{ and } (x_1, y_1) \text{ is a } \underline{________})\]

* Use Point-Slope Form when you are given (or can find) the slope and a point.

**Ex 2:** Write the equation of the line with a slope of 2 that goes through the point \((4, -3)\) in point-slope form.

Your Turn: Write the equation of the line in point-slope form.

1. \((2, 9); m = -2\)
2. \((-3, -1); m = 4\)
If you are given two points (but not the slope):

| Step 1: Calculate the slope using the slope formula. |
| Step 2: Substitute the slope and ONE of the two points into point-slope form. |

Ex 3: Write the equation of the line that passes through the points \((-1, 4)\) and \((5, 8)\) in point-slope form.

1. Find the slope using the slope formula:

2. Substitute the slope and ONE point into point-slope form:
   (it doesn’t matter which point you substitute!)

Your Turn: Write the equation of the line in point-slope form.

3. \((-8, 2)\) \& \((-6, 8)\)
4. \((0, 5)\) \& \((4, 17)\)
If we know the **slope** and a **point**, we can use point-slope form first and then rewrite in slope-intercept form.

Ex 2: Write the equation of the line with a slope of 2 that goes through the point (4, -3) in **slope-intercept form**.

Since we know the slope and a point, use point-slope form:

Then, rewrite in slope-intercept form:

Your Turn:
Write the equation of the line in **point-slope form**.
THEN, rewrite in **slope-intercept form**.

5. \((2, 9); m = -2\)
6. \((-3, -1); m = 4\)
Ex 3: Write the equation of the line that passes through the points (3, 4) and (5, 8) in slope-intercept form.

We aren’t given the slope, but we can find it using the slope formula:

Now, substitute the slope and ONE point into point-slope form:

Then, rewrite in slope-intercept form:

Your Turn:
Write the equation of the line in point-slope form.
THEN, rewrite in slope-intercept form.

7. \((-8, 2) \& (-6, 8)\)  
8. \((0, 5) \& (4, 17)\)
Special Cases – Horizontal and Vertical Lines

Remember HOY-VUX:

\[
\begin{array}{ll}
H & V \\
O & U \\
Y & X \\
\end{array}
\]

Write the equation of the line with the given information in slope-intercept form.

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a) [ m = 0; (9, 4) ]</td>
<td>b) [ m = \text{undefined}; (-3, 5) ]</td>
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<tr>
<td>c) [ \text{passes through (6, 1) and (6, -5)} ]</td>
<td>d) [ \text{passes through (3, -5) and (-7, -5)} ]</td>
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