3.1 Graphing Equations (Lecture Notes p35)

Determine if an ordered pair (Point) is a solution to an equation in two variables.

See notes

Determine if a equation in two variables is \textbf{linear} or \textbf{non-linear}.

Math language

- \(\frac{1}{3}y\) or \(\frac{1}{3}y\) - one third \(y\)
- \(2x^2\) - \(x\) squared
- \(\sqrt{2x}\) - square root of \(2\) times \(x\)

\textbf{Do not use the word 'over' when you have a fraction.}

Standard Form

\(Ax + By = C\) - if it can be put in Standard form

\(A, B, C\) are real numbers.

3.11

<table>
<thead>
<tr>
<th>Linear equation in two variables</th>
<th>Nonlinear equation in two variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y = 3x + 4) (\Rightarrow 3x + 1y = 4)</td>
<td>(2x^3 + 5y = 10)</td>
</tr>
<tr>
<td>(y = -4x - 9) (\Rightarrow 4x + 3y = -4)</td>
<td>(y^2 + 3y = 1)</td>
</tr>
<tr>
<td>(y = 3x^2) (\Rightarrow 3)</td>
<td>(y = 3x^3) (\Rightarrow 4)</td>
</tr>
</tbody>
</table>
3.1 Graphing Equations (Lecture Notes p35)

Determine if an ordered pair (x, y) is a solution of an equation in two variables.

See notes.

Determine if a equation in two variables is linear or nonlinear line.

Math language:
- \( \frac{1}{3} y \) or \( \frac{1}{3} y \) - one third \( y \)
- \( 2x^2 \) - two \( x \) squared
- \( \sqrt{2x} \) - square root of \( 2 \) times \( x \)

Do not use the word ‘over’ when you have a fraction.

Standard form:
- \( Ax + By = C \) - if it can be put in Standard form
- \( \text{real } \# \) where \( A, B, C \) are.

<table>
<thead>
<tr>
<th>Linear Equation in Two Variables</th>
<th>Nonlinear Equation in Two Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y = 3x + 4 ) ( \Rightarrow ) ( -3x + y = 4 )</td>
<td>( 2x^3 + 5y = 10 )</td>
</tr>
<tr>
<td>( y = -4x - 4 ) ( \Rightarrow ) ( 4x + y = -4 )</td>
<td>( x^2 + 3y = 1 )</td>
</tr>
<tr>
<td>( y = 3x^3 )</td>
<td>( y = \text{won't be shaped like a line} )</td>
</tr>
</tbody>
</table>

* Will be shaped like a line
* Won't be shaped like a line
(35) Determine if the equation \( y = -\frac{1}{3}x - 1 \) is linear.

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

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

\[
\uparrow \\
\text{real} \\
\text{real} \\
\text{real}
\]

---

**Graph Equations in Two Variables**

**6 steps**

1) Assume a value for one variable (x or y) then solve for the other value

2) Express as ordered pair

3) Repeat Steps 1 & 2 until you have "enough" points

4) Determine scale for x- and y- axis

5) Plot ordered pairs

6) Connect points
32) Graph the equation \( y = |x + 1| \)

\[ \text{if equation is } y = \underline{\text{______}} \]
\[ \text{assume values for } x \]

\[ \text{if equation is } x = \underline{\text{______}} \]
\[ \text{assume values for } y \]

We will assume some values for \( x \)

\[ y = |x + 1| \]

\( x \) \hspace{0.5cm} \( y \)
\hline
-3 & 2 \\
-2 & 1 \\
-1 & 0 \\
0 & 1 \\
1 & 2 \\
2 & 3 \\

If \( x = 3 \) then \( \quad \)
\[ y = |3 + 1| \]
\[ y = 4 \]

If \( y = 3 \) then \( \quad \)
\[ y = |1 + 1| \]
\[ y = 2 \]

If \( x = -2 \) then \( \quad \)
\[ y = 1 - 2 + 1 \]
\[ y = 0 \]