Algebra 2 Trig

Unit 1 Lesson 1: Analyzing Graphs

Increasing

(-3, 2) U (1, \infty)

Decreasing

(-\infty, -4) U (-2, 1)

Constant

(-4, -3)

When describing the areas where the graph is increasing, decreasing, or constant you only use ____________.

### Extremes

**Absolute Maximum**

The true highest point

**Absolute Minimum**

The true lowest point

**Relative Maximum**

Any high point

**Relative Minimum**

Any low point

<table>
<thead>
<tr>
<th></th>
<th>Relative Max</th>
<th>Relative Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where</td>
<td>X</td>
<td>X = -2</td>
</tr>
<tr>
<td>What</td>
<td>y</td>
<td>10</td>
</tr>
<tr>
<td>Location</td>
<td>(x, y)</td>
<td>(-2, 10)</td>
</tr>
<tr>
<td>Is it the absolute?</td>
<td>NO</td>
<td>YEs</td>
</tr>
</tbody>
</table>
Analyze each of the following graphs. Assume if the graph does not have a specific endpoint, it is continuous beyond the window of the graph paper.

1. Function? Yes or no?

   Domain: \( (-\infty, \infty) \)

   Range: \( (-\infty, 1] \)

   \( f(2) = 1 \)
   \( f(-3) = -4 \)

   If \( f(x) = 0 \) find \( x \):
   \( y = 0 \) \( x = \) ?

   Increasing: \( (-\infty, 2) \)

   Decreasing: \( (2, \infty) \)

   Constant: 

   Relative Max(s): Where? \( x = 2 \) What? 1

   Relative Min(s): Where? 

   Is it the absolute max? yes

   Is it the absolute min? 

2. Function? Yes or no?

   Domain: \( [-5, 10] \)

   Range: \( [-3, 3] \)

   \( f(2) = 1.5 \)

   \( f(4) = 0 \)

   If \( f(x) = 2 \) find \( x \):
   \( y = 2 \) \( x = 0, 8 \)

   Increasing: \( (-\infty, 0) \cup (4, 10) \)

   Decreasing: \( (0, 4) \)

   Constant: 

   Relative Max(s): Where? \( x = 0 \) What? 2

   Relative Min(s): Where? \( x = 4 \) What? 0

   Is it the absolute max? no

   Is it the absolute min? no
3. **Function:** Yes or no?
   - **Domain:** $[-6, 8]$
   - **Range:** $[-2, 2]$
   - $f(2) = -1$
   - $f(-3) = 1.5$
   - If $f(x) = 2$ find $x$: $x = 2, \ [4, 8]$
   - **Increasing:** $(-5, -2) \cup (1, 4)$
   - **Decreasing:** $(-6, -5) \cup (-2, 1)$
   - **Constant:** $(4, 8)$
   - **Relative Max(s): Where?** $x = -2$
     - **What?** $2$
     - **Is it the absolute max?** Yes
   - **Relative Min(s): Where?** $x = -5$
     - **What?** $-2$
     - **Is it the absolute min?** Yes

4. **Function:** Yes or no?
   - **Domain:** $(-\infty, \infty)$
   - **Range:** $(-\infty, 7)$
   - $f(-1) = 1$
   - $f(3) = 5$
   - If $f(x) = 4$ find $x$: $x = 4$
   - **Increasing:** $(-\infty, -1)$
   - **Decreasing:** $(3, \infty)$
   - **Constant:** $(-1, 3)$
   - **Relative Max(s): Where?**
     - **What?**
     - **Is it the absolute max?**
   - **Relative Min(s): Where?**
     - **What?**
     - **Is it the absolute min?**