

$y = \begin{cases} 5 & \text{if } x < -2 \\ \frac{1}{2}x - 6 & \text{if } -2 \leq x \leq 6 \\ -2x + 10 & \text{if } x > 6 \end{cases}$

$f(-4) = 5$        $f(8) = -6$        $f(-2) = -7$

$y = -2x + 10$   
 $y = (-2)(8) + 10$   
 $y = -6$

$y = \frac{1}{2}(-2) - 6$   
 $y = -7$

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**Properties of Functions**  
**DOMAIN and RANGE**

Domain: All possible **X-VALUES** of the function  
 Range: All possible **Y-VALUES** of the function

Examples:  
 $\{(0, 1), (1, 1), (2, 8), (3, 27)\}$  is a function.  
 dom f:  $[0, 3]$      $(0, 1, 2, 3)$   
 ran f:  $\{1, 2, 8, 27\}$      $(1, 8, 27)$

$\text{dom f: } ]-\infty, +\infty[$      $\text{ran f: } ]-\infty, +\infty[$   
 $\text{dom f: } ]-\infty, +\infty[$      $\text{ran f: } ]-\infty, +\infty[$   
 $\text{dom f: } ]-\infty, +\infty[$      $\text{ran f: } ]-\infty, +\infty[$

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**Variation of a Function**  
(Increasing & Decreasing)

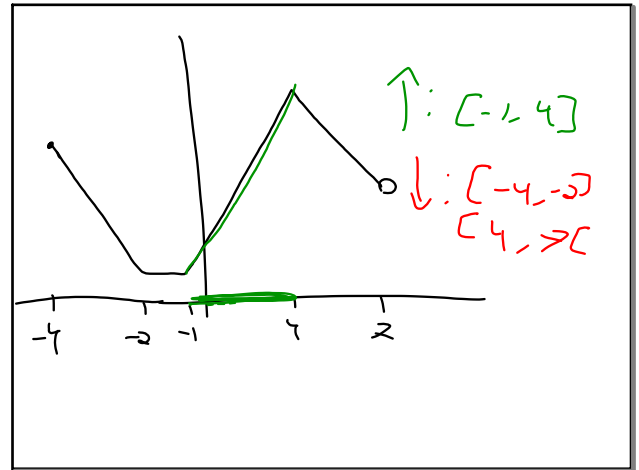
EXAMPLES:

$\uparrow: [1, +\infty[$   
 $\downarrow: ]-\infty, 1]$

$\uparrow: \emptyset$   
 $\downarrow: [-2, +\infty[$

$\uparrow: \emptyset$   
 $\downarrow: ]-\infty, 3]$

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Feb 18-3:29 PM

Find the domain, range and intervals where the following functions are increasing or decreasing.

$D: [-3, 4]$   
 $R: [-1, 4]$   
 $\uparrow: [1, 2]$   
 $\downarrow: [-3, 1]$

$f(x) = x^2$        $f(x) = -x^2$

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**SIGN of a Function (Positive & Negative)**

Studying the **SIGN** of a function means **FINDING THE VALUES of X** for which the function is:

- POSITIVE** (When Y is greater or equal to 0)
- NEGATIVE** (When Y is less or equal to 0)

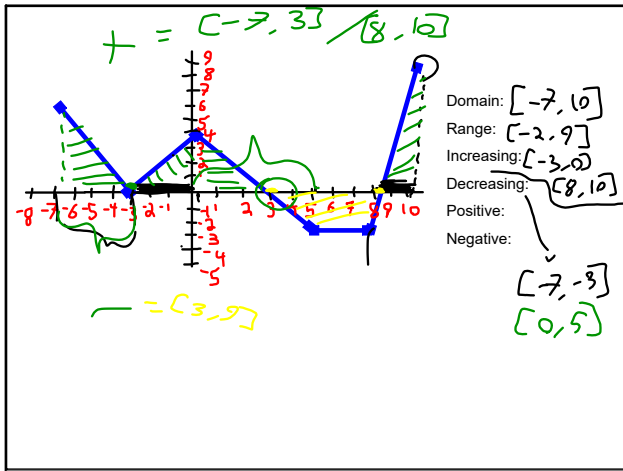
EXAMPLES:

$+$   $]:-\infty, 0], [0, +\infty[$   
 $-$   $]:0, 2]$

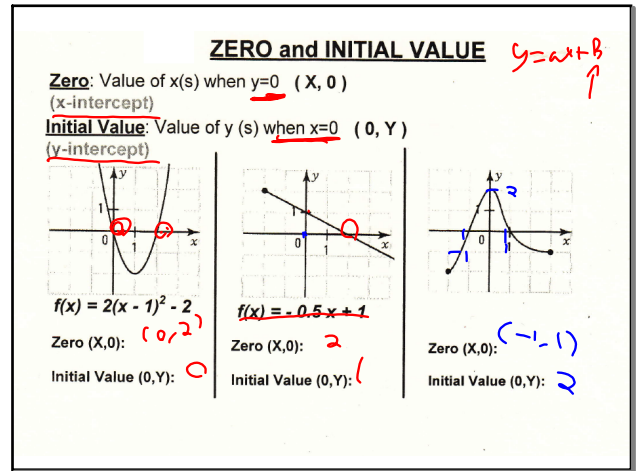
$+$   $]:-2, 2]$   
 $-$   $]:2, +\infty[$

$+$   $]:-1, 1]$   
 $-$   $]:-2, -1], [1, 2]$

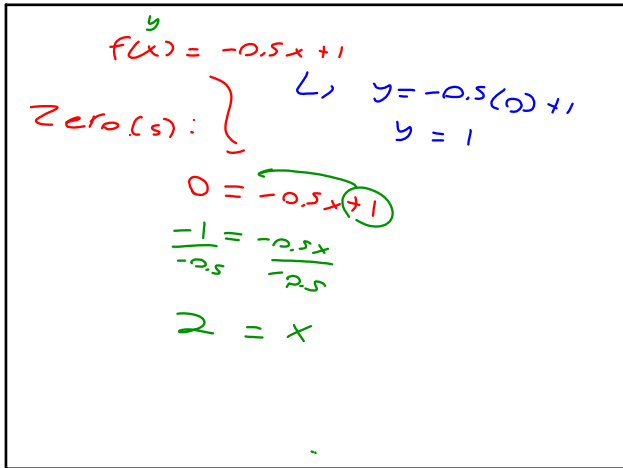
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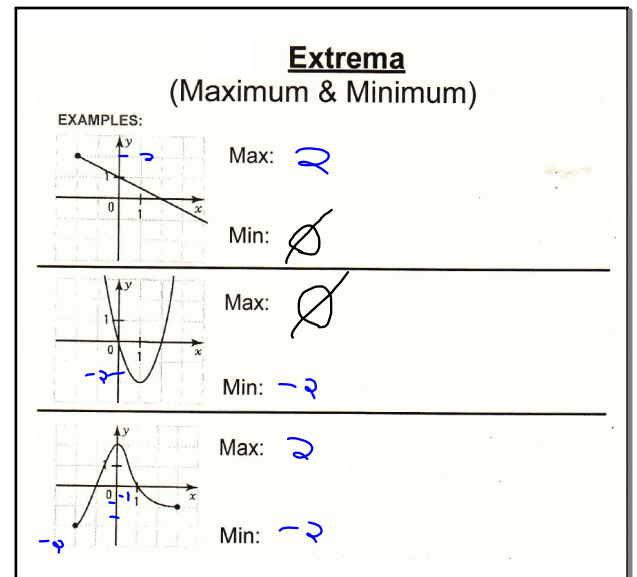
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Feb 21-11:45 AM



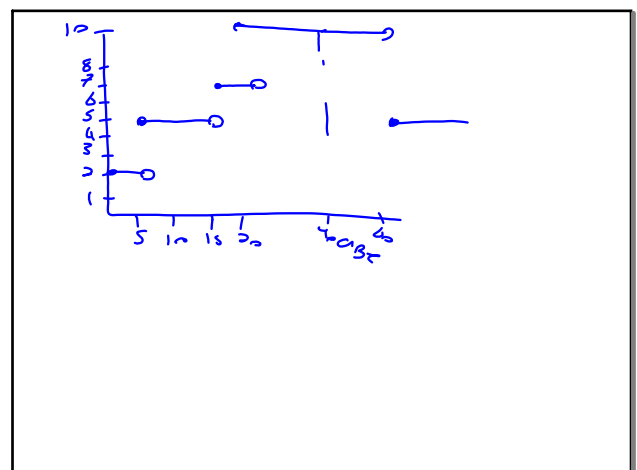
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Step Graph:

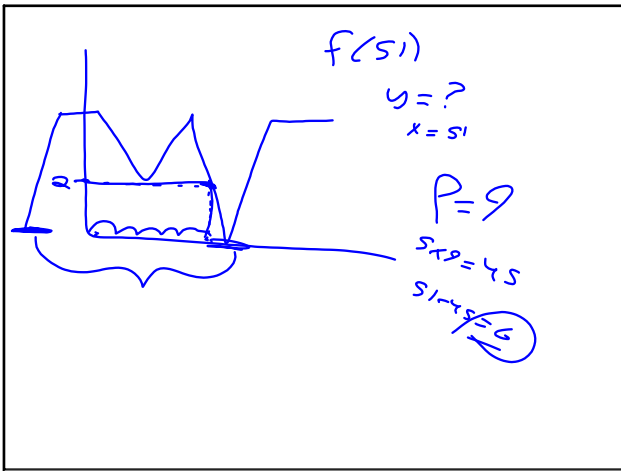
Periodic:

Piecewise:

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Feb 18-3:51 PM



Feb 21-12:05 PM

Handwritten mathematical work:

$$\rightarrow 0.005x + 125 \quad 50000 \leq x < 120000$$

↑  
95000

$$\underline{647.5} \text{ \$}$$

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