

NOTES: INCREASING AND DECREASING

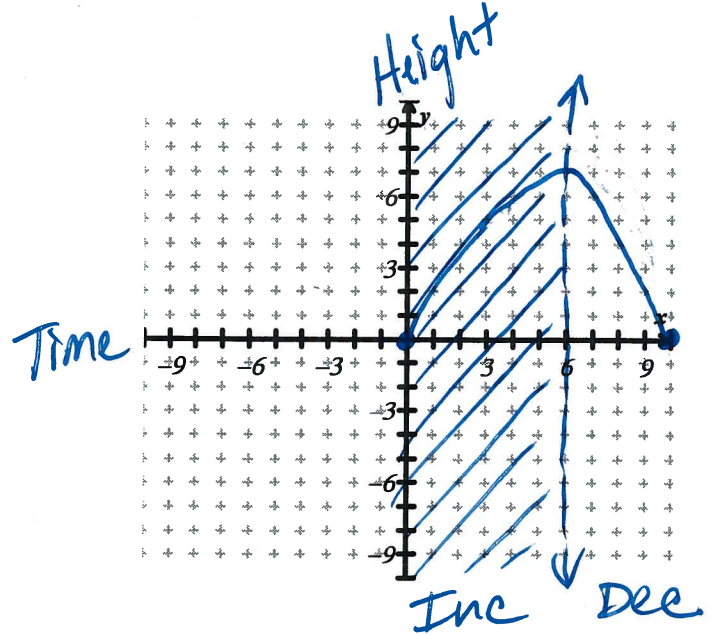
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DAY 4

OBJECTIVE: Today you will learn how to determine when a graph is increasing and decreasing!

1. Rollercoaster Problem:

Increasing: $(0, 6)$

Decreasing: $(6, 10)$



② Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

Relative Max: $(-2, 2)$

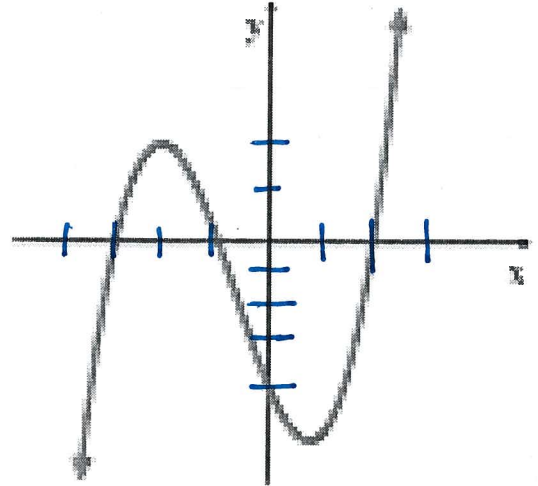
Relative Min: $(1, -4)$

Absolute Max: ∞

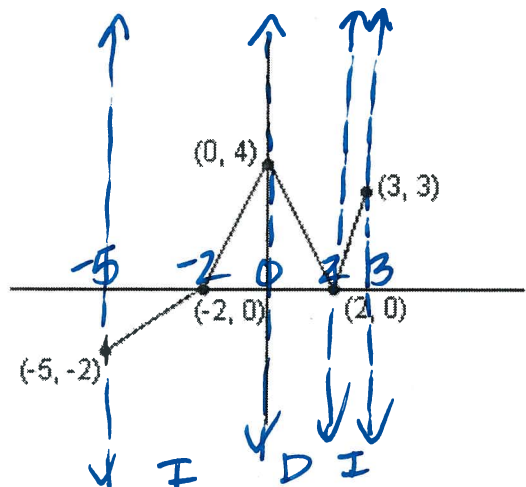
Absolute Min: $-\infty$

Increasing: $(-\infty, -2) \cup (1, \infty)$

Decreasing: $(-2, 1)$



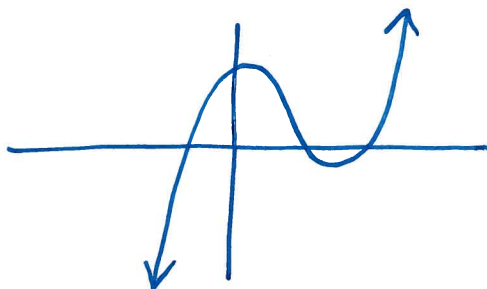
3) Find the following using the following graph:



Domain: $[-5, 3]$ Range: $[-2, 4]$
 x -intercept(s): $(-2, 0)$ $(2, 0)$ y -intercept: $(0, 4)$
 Local minimum: $(2, 0)$ absolute min: $(-5, -2)$
 Local maximum: $(0, 4)$ absolute max: $(0, 4)$
 Increasing interval(s): $(-5, 0) \cup (2, 3)$
 Decreasing interval(s): $(0, 2)$

CALCULATOR GRAPHING

4. Graph $x^3 - 9x^2 + 8x + 60$ using your calculator. Sketch its graph below.



- Determine the number of zeros for the polynomial 3
- Determine where real zeros for the polynomial $x = -2, 5, 6$
- Determine the number of turning points 2
- Does the graph have relative minimums or maximums? Max: 61.877, Mm: -1.877
- Does the graph have absolute minimums or maximums? None
- Describe the end behavior of the graph:

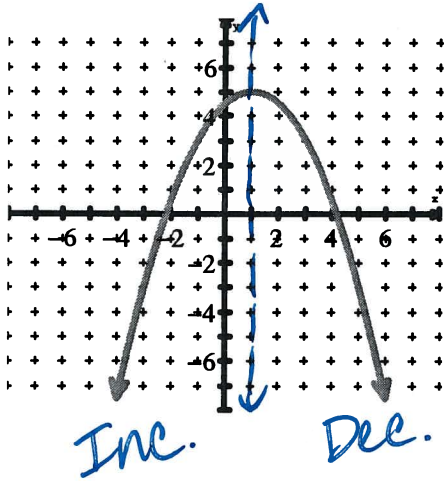
Right Side: UP

Left Side: down

PRACTICE:

KEY FEATURES OF POLYNOMIAL FUNCTIONS

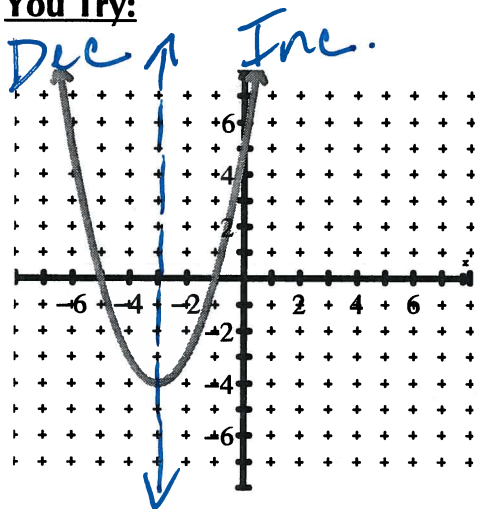
Example:



Increasing: $(-\infty, 1)$ $-\infty < x < 1$

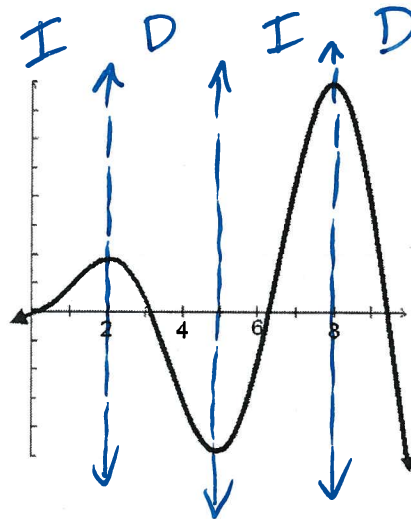
Decreasing: $(1, \infty)$ $1 < x < \infty$

You Try:



Increasing: $(-3, \infty)$

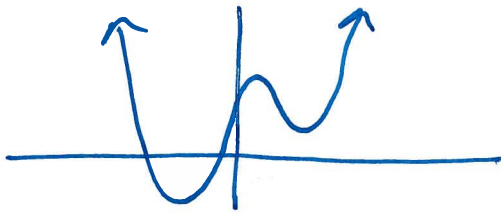
Decreasing: $(-\infty, -3)$



Increasing: $(-\infty, 2) \cup (5, 8)$

Decreasing: $(2, 5) \cup (8, \infty)$

1. Graph $y = 3x^4 + x^3 - 10x^2 + 2x + 7$ using your calculator. Sketch its graph below.



- a. Determine the number of zeros for the polynomial 2
- b. Determine the number of real zeros for the polynomial 2
- c. Determine the number of turning points 3
- d. Does the graph have relative minimums or maximums? Yes
- e. Does the graph have absolute minimums or maximums? Yes
- f. Describe the end behavior of the graph:

Right Side: UP

Left Side: UP

2. Graph $y = 2x^3 - 3x^2 + 2$ using your calculator. Sketch its graph below.



- a. Determine the number of zeros for the polynomial 1
- b. Determine the number of real zeros for the polynomial 1
- c. Determine the number of turning points 2
- d. Does the graph have relative minimums or maximums? Yes
- e. Does the graph have absolute minimums or maximums? Yes

Right Side: Up

Left Side: Down