

8.4 POLYNOMIAL ATTRIBUTES

WARM-UP MONDAY

Factor the following polynomials to find all solutions.

$$g(x) = x^2 - 5x - 6$$

$\{6, -1\}$

$$(x^2 - 6x) + 1(x - 6)$$

$$x(x - 6) + 1(x - 6)$$

$$(x - 6)(x + 1)$$

$x - 6 = 0 \quad x + 1 = 0$
 $x = 6 \quad x = -1$

$$f(x) = (3x^3 + 4x^2 - 27x - 36)$$

$$x^2(3x + 4) - 9(3x + 4)$$

$$(3x + 4)(x^2 - 9)$$

$$(3x + 4)(x - 3)(x + 3)$$

$$3x + 4 = 0 \quad x - 3 = 0 \quad x + 3 = 0$$

$$\frac{3x}{3} = \frac{-4}{3} \quad x \cdot 3 = 0 \quad x + 3 = 0$$

$$\frac{-4}{3} \quad 3 \quad -3$$

ABOUT ME:

1. Would you rather play a villain or a hero in a movie?
2. Cookies or cake?

$$x^2 - 9 = 0$$

$$\sqrt{x^2} = \sqrt{9}$$

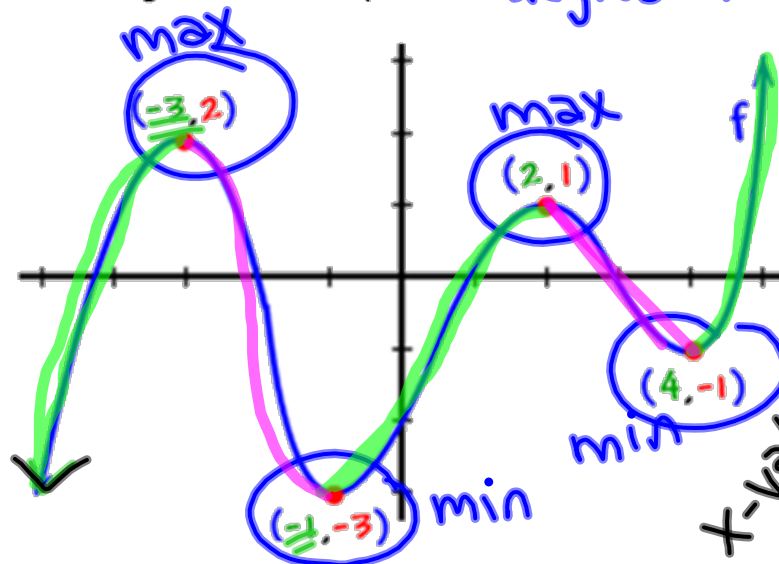
$$x = 3$$

zeros

8.4 POLYNOMIAL ATTRIBUTES

EQ: How do we find where a function is increasing or decreasing?

"Turning Points" most possible: **degree - 1**



Local (relative) Extrema: **y-values**

→ minimum -3 @ $x = -1$
 -1 @ $x = 4$

→ maximum 2 @ $x = -3$
 1 @ $x = 2$

Where is the graph increasing?
 going up from left to right
 $(-\infty, -3) \cup (-1, 2) \cup (4, \infty)$

End behavior:

As $x \rightarrow -\infty$ (Left), $y \rightarrow -\infty$ down $\leftrightarrow \lim_{x \rightarrow -\infty} f(x) = -\infty$

As $x \rightarrow \infty$ (right), $y \rightarrow \infty$ up $\leftrightarrow \lim_{x \rightarrow \infty} f(x) = \infty$

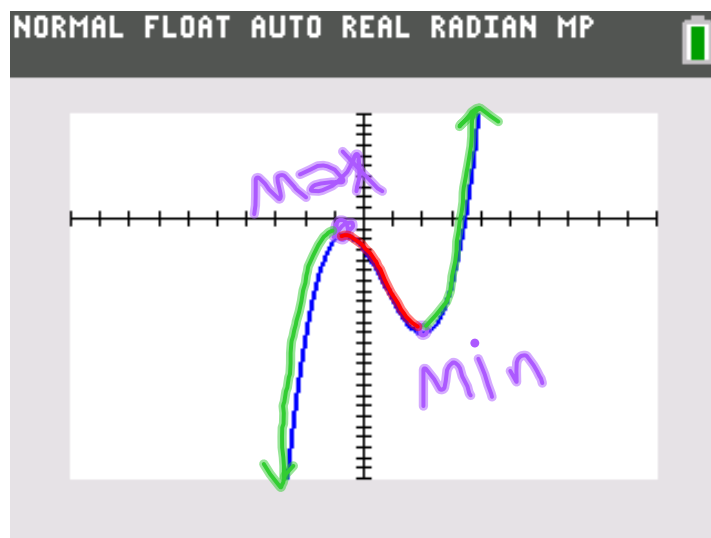
Decreasing?
 going down from L to R
 $(-3, -1) \cup (2, 4)$

8.4 POLYNOMIAL ATTRIBUTES

EQ: How do we find where a function is increasing or decreasing?

Calculator

ex: $x^3 - 2x^2 - 4x - 3$



- Type into $y=$
- Adjust window
- 2nd TRACE 3: min or 4: max

Max: $-1.519 @ x = -.667$

Min: $-11 @ x = 2$

increasing:

$(-\infty, -.667) \cup (2, \infty)$

decreasing:

$(-.667, 2)$

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EQ: How do we find where a function is increasing or decreasing?

GET YOUR DEVICE (PHONE WON'T WORK VERY WELL...)

Hey, students!

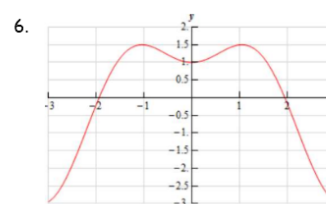
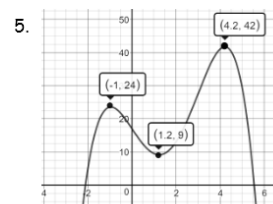
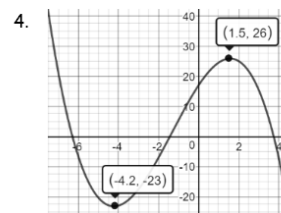
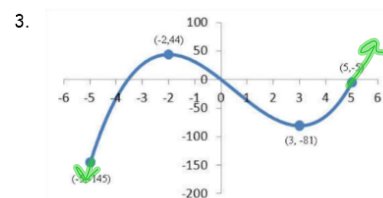
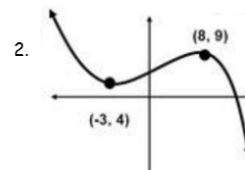
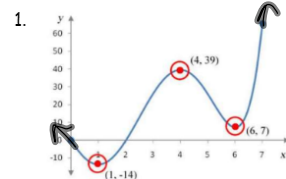
Go to student.desmos.com
and type in:

E83F3

Name: _____

8.4 Graph Attributes

For each graph, find all local extrema and label as a local min or max. List the intervals on which the function is increasing and decreasing and the end behavior of the function. Assume all graphs have arrows at the ends.



Using a graphing calculator, determine all relative maxima and relative minima

7. $f(x) = x^2 - 3x + 2$ 8. $f(x) = x^3 + 3x^2 - 3$ 9. $f(x) = -x^4 + x^3 + 3x^2 - 2x + 4$

8.4 POLYNOMIAL ATTRIBUTES

EQ: How do we find where a function is increasing or decreasing?

EXIT TICKET

on classroom

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TODAY IS A WORK DAY!!

- project is due Monday (all parts)
- Notebook check on Thursday
- Online quiz for unit 10 is due ~~FRIDAY~~
- Algebra Midterm is Thurs/Fri
 - > You may have ONE partner! Tell me who today

