

Name: _____

Date: _____

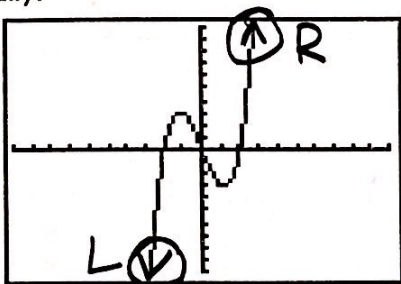
End Behavior:

Look left and right, to figure out what's happening up and down.

Right $x \rightarrow +\infty$ $f(x) \rightarrow$ _____ } up or down
 Left $x \rightarrow -\infty$ $f(x) \rightarrow$ _____ } towards ∞ OR $-\infty$

Graphically:

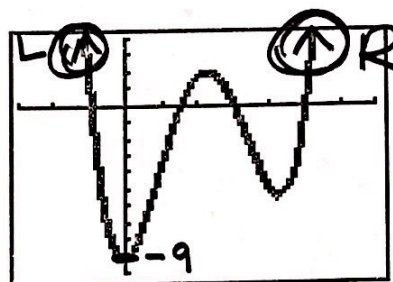
1.



R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow -\infty$

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

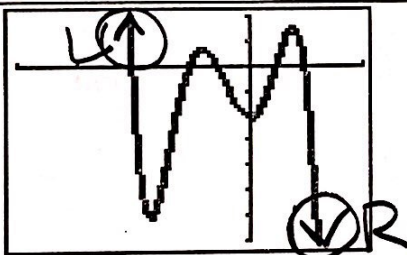
2.



R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow \infty$

Domain: $(-\infty, \infty)$
 Range: $[-9, \infty)$

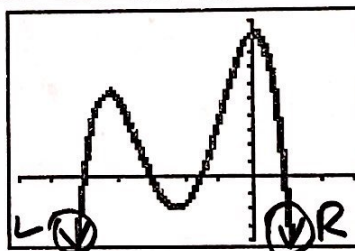
3.



R $x \rightarrow +\infty$ $f(x) \rightarrow -\infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow \infty$

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

4.



R $x \rightarrow +\infty$ $f(x) \rightarrow -\infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow -\infty$

Domain: $(-\infty, \infty)$
 Range: $(-\infty, 9]$

Algebraically:

5. $f(x) = x^4 + 2x^2 - 3x$

$1x^4$ L \uparrow \uparrow R

R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow \infty$

6. $f(x) = -x^5 + 3x^4 - x$

$-1x^5$ L \uparrow \downarrow R

R $x \rightarrow +\infty$ $f(x) \rightarrow -\infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow \infty$

7. $f(x) = 2x^3 - 3x^2 + 5$

$2x^3$ L \downarrow \uparrow R

R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow -\infty$

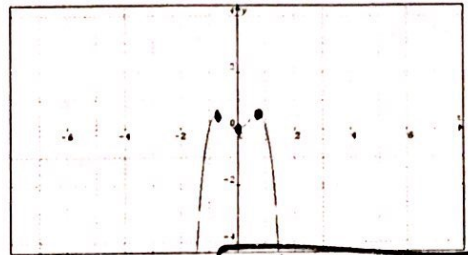
Graphically, what is the least possible degree?

8.



$2 + 1 = 3^{\text{rd}} \text{ degree}$

9.



$3 + 1 = 4^{\text{th}} \text{ degree}$

Algebraically, what is the number of extrema (vertices or turning points)?

10. $f(x) = x^4 + 2x^3 - 3x$
 $4 - 1 = 3$

3 OR 1

11. $f(x) = 2x^6 + 3x - 2$
 $6 - 1 = 5$

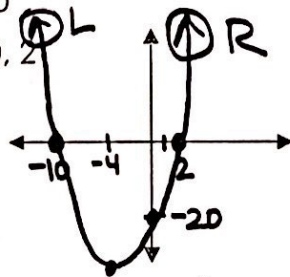
5 OR 3 OR 1

12. $f(x) = -x^3 + x^2 + 2x - 1$
 $3 - 1 = 2$

2 OR 0

Sketching: Given the polynomial and zeros, sketch a graph and determine the characteristics

13. $f(x) = x^2 + 8x - 20$
 given zeros: $-10, 2$

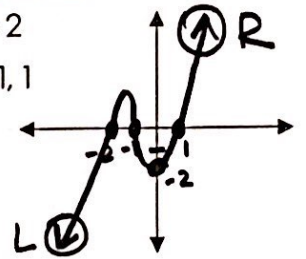


of Zeros: 2 Y-Int: (0, -20)

R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow \infty$ # of extrema 1
 Domain: $(-\infty, \infty)$
 Range: $[-36, \infty)$

V: $(-4, -36)$

14. $f(x) = x^3 + 2x^2 - x - 2$
 given zeros: $-2, -1, 1$



of Zeros: 3 Y-Int: (0, -2)

R $x \rightarrow +\infty$ $f(x) \rightarrow \infty$
 L $x \rightarrow -\infty$ $f(x) \rightarrow -\infty$ # of extrema 2
 Domain: $(-\infty, \infty)$
 Range: $(-\infty, \infty)$