$\qquad$

1. For each of the following power functions roughly sketch the graph and then describe the end behavior. Do not use your calculator.

|  | $g(x)=x^{300}$ | $f(x)=-x^{13}$ |
| :---: | :---: | :---: |
| Rough Sketch |  |  |
| End Behavior | As $x \rightarrow \infty, y \rightarrow \infty ;$ As $x \rightarrow-\infty, y \rightarrow \infty$ | As $x \rightarrow \infty, y \rightarrow-\infty ;$ As $x \rightarrow-\infty, y \rightarrow \infty$ |

2. What part(s) of the equation did you look at to determine what the end behavior would be in \#1?

1 looked at the exponent and the coefficient. If the exponent is even then both ends will go the same direction. If the exponent is odd then the ends will go in different directions. If the coefficient is positive, the right side will approach infinity. If the coefficient is negative then the right side will approach negative
infinity.

* Follow Up Practice for Q1 and Q2

For each of the following power functions roughly sketch the graph and then describe the end behavior.

|  | $g(x)=-2 x^{12}$ | $f(x)=x^{17}$ |
| :---: | :---: | :---: |
| Rough Sketch |  |  |
|  | What is the exponent on this function? | What is the exponent on this function? |
|  | This exponent tells me: | This exponent tells me: |
|  | a) The graph will go up on one end and | a) The graph will go up on one end and |
|  | b) The graph will go up on both ends or down on both ends. | b) The graph will go up on both ends or down on both ends. |
|  | What is the coefficient? | What is the coefficient? |
|  | What does that tell you about the end behavior? | What does that tell you about the end behavior? |
|  | a) As $x \rightarrow \infty, y \rightarrow \infty$ and As $x \rightarrow-\infty, y \rightarrow \infty$ | a) As $x \rightarrow \infty, y \rightarrow \infty$ and As $x \rightarrow-\infty, y \rightarrow \infty$ |
|  | b) As $x \rightarrow \infty, y \rightarrow-\infty$ and As $x \rightarrow-\infty, y \rightarrow \infty$ | b) As $x \rightarrow \infty, y \rightarrow-\infty$ and As $x \rightarrow-\infty, y \rightarrow \infty$ |
|  | c) As $x \rightarrow \infty, y \rightarrow-\infty$ and As $x \rightarrow-\infty, y \rightarrow-\infty$ | c) As $x \rightarrow \infty, y \rightarrow-\infty$ and As $x \rightarrow-\infty, y \rightarrow-\infty$ |
|  | d) As $x \rightarrow \infty, y \rightarrow \infty$ and As $x \rightarrow-\infty, y \rightarrow-\infty$ | d) As $x \rightarrow \infty, y \rightarrow \infty$ and As $x \rightarrow-\infty, y \rightarrow-\infty$ |

3. Determine if each equations below is an even function, odd function, or neither.

| $f(x)=5 x^{2}-3$ | $w(x)=12 x^{5}+3 x^{2}-5$ | $g(x)=3 x^{3}-2 x$ |
| :---: | :---: | :---: |
| Even. <br> Both exponents are even AND $f(-x)=5(-x)^{2}-3=5 x^{2}-3$ $\text { so } f(-x)=f(x)$ <br> The graph is symmetric around the $y$-axis. | Neither. <br> some exponents are odd and some are even. $\begin{aligned} w(-x)=12(-x)^{5}+3 & (-x)^{2}-5 \\ = & -12 x^{5}+3 x^{2}-5 \end{aligned}$ <br> The first sign changed but the last two did not. The graph is not symmetric around the origin or the $y$-axis. | Odd. <br> Both exponents are odd AND $g(-x)=3(-x)^{3}-2(-x)=-3 x^{2}+2 x$ <br> sog $(-x)=-g(x)$. <br> The graph is symmetric around the origin. |

* Follow Up Practice for Q3

Determine if each equations below is an even function, odd function, or neither. Give all 3 reasons for each.

| $f(x)=-2 x^{3}+3$ | $w(x)=10 x^{4}-2 x^{2}-1$ | $g(x)=x^{3}-2 x$ |
| :--- | :--- | :--- |
| Graph: | Graph: | Graph: |
| Value of $f(-x):$ | Value of $w(-x):$ | Value of $g(-x):$ |
| Exponents: | Exponents: | Exponents: |
| Circle one: odd, even, or neither | Circle one: odd, even, or neither | Circle one: odd, even, or neither |

