Math 4 Honors Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lesson 1-1: *Families of Functions Review* Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Learning Goals:

|  |
| --- |
| * *I can find the domain and range of various function families.*
* *I can use and apply properties of linear, exponential, power, logarithmic and inverse variation functions.*
 |
| * *I can use the parameters of functions to predict the shape and end behavior of function families.*
* *I can understand limit notation and its relationship to end behavior.*
 |

Use the following function to answer the questions below:

1. Complete the following table of values.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | -10,000 | -1000 | -100 | -10 | 0 | 10 | 100 | 1000 | 10,000 |
| *f(x)* |  |  |  |  |  |  |  |  |  |

1. As the value of *x* decreases, what value does *f(x)* appear to approach? \_\_\_\_\_\_\_\_\_\_
2. As the value of *x* increases, what value does *f(x)* appear to approach? \_\_\_\_\_\_\_\_\_\_
3. Describe the end behavior using limit notation.
4. What is the domain? (use ***interval notation***) 5. What is the range? (use ***interval notation***)

Important Vocabulary:

A function is **even** if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A function is **odd** if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. Draw an example of an even function 7. Draw an example of an odd function.

 that is *not* *y = x*2. that is *not* *y = x*3.

Equation: Equation:

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**List the type, characteristics and sketch a graph for the following functions.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

8.General Rule: Example:

 *f*(*x*) = *bx* + *c*

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

 End Behavior:

 What happens if the leading coefficient has the opposite sign?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

9. General Rule: Example:

 $f\left(x\right)=-4x^{2}+7x-19$

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

 End Behavior:

 What happens if the leading coefficient has the opposite sign?

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**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

10. General Rule: Example:

 $f(x)=e^{x}$

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

End Behavior:

The function above is an example of exponential growth. Give an example of a function that represents exponential decay:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

11**.** General Rule: Example:

 $f(x)=ln⁡(x)$

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

End Behavior:

How does the function above relate to $g\left(x\right)=e^{x}?$

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**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

12. General Rule: Example:

  *f*(*x*) = 8*x*2

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

 End Behavior:

 How would the graph change if *r* were an odd integer?

 How would the graph change if *k* were negative?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

13. General Rule: Example:

 $f(x)=\frac{6}{x^{2}}$

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

 End Behavior:

 How would the graph change if *r* were an odd integer?

 How would the graph change if *k* were negative?

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**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Functions**

14. General Rule: Example:

 

Domain:

Range:

Symmetries (if any):

 Even, Odd, Neither

Asymptotes (if any):

 End Behavior:

**Practice:**

1. Describe what happens to *f(x)* as |*x*| grows larger and larger in magnitude. In other words, use limit

notation to describe the end behavior of each function. If the limit does not exist, write *d.n.e.*

2. State whether the function is *even, odd* or *neither*.

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**Math 3 Honors Review**

1. On the axis below, draw an example of an even degree polynomial, with a negative leading coefficient have four real roots and a positive *y*-intercept.

![[image]]()

![[image]]()

1. Consider the graph of the function to the right.

What are some characteristics of the function?

(Degree, zeros, leading coefficient, *y*-intercept,

possible equation)

\*\*\* Describe the end behavior, using the correct limit notation

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![[image]]()3. Sketch a possible graph of *y* = -(*x* – 2)(*x* + 1)(*x* + 3)(*x* – 1) on the axis below (without your calculator).

\*\*\* Describe the end behavior, using the correct limit notation.

![[image]]()4. Find the equation for the graph below.



5. Sample SAT question:



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6. PSAT Practice

 i.



 ii.



 iii.



 iv. **below**

