**Section 1.3: Properties of Graphs and Functions**

**Definitions:**

**INTERVALS OF INCREASE** - The interval(s) within a function's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, where the \_\_\_\_ values of the function get \_\_\_\_\_\_\_, moving from \_\_\_\_\_\_to \_\_\_\_\_\_\_\_

**INTERVALS OF DECREASE** - The interval(s) within a function's \_\_\_\_\_\_\_\_\_\_\_\_\_, where the \_\_\_\_\_ values of the function get \_\_\_\_\_\_\_\_\_, moving from \_\_\_\_\_\_to \_\_\_\_\_\_\_\_\_



State the intervals of increase and decrease for the function on the left.

**EVEN FUNCTION**

Any function that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ about the \_\_\_\_\_axis; algebraically all even functions have the property \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The function above is an example of an \_\_\_\_\_\_\_\_ function.

Draw another example of another even function.

What is the equation of the function above?

Show that f(-x) = f(x).

What do you get if you sub in x into the equation?

What do you get if you sub in –x into the equation?

Are they equal?

**ODD FUNCTION**

Any function that has the rotational symmetry about the origin; algebraically all odd functions have the property \_\_\_\_\_\_\_\_\_\_\_\_\_\_.



What is the equation of the function of the left?

Show that f(-x) = -f(x)

Let x= 2

Calculate f(-x) Calculate – f(x)

Are they equal?

**CONTINUOUS FUNCTION**

Any function that does not contain any \_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_over its entire domain



Draw another example of a continuous function.

Is the function above even or odd or neither?

**DISCONTINUITY**

A \_\_\_\_\_\_\_\_\_\_\_\_ in the graph of a function is called a point of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Draw another example of a discontinuous function.

Is the function displayed on the left even, odd or neither?

INVESTIGATING OUR 7 PARENT FUNCTIONS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | Intervals of Increase | Intervals of Decrease | Odd or Even? | Horizontal/Vertical Asymptotes | End Behaviours | Continuous or Discontinuous | Domain and Range | Zeros |
| $$y=x$$ |  |  |  |  |  |  |  |  |
| $$y=x^{2}$$ |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | Intervals of Increase | Intervals of Decrease | Odd or Even? | Horizontal/Vertical Asymptotes | End Behaviours | Continuous or Discontinuous | Domain and Range | Zeros |
| $$y=\frac{1}{x}$$ |  |  |  |  |  |  |  |  |
| $$y=\left|x\right|$$ |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | Intervals of Increase | Intervals of Decrease | Odd or Even? | Horizontal/Vertical Asymptotes | End Behaviours | Continuous or Discontinuous | Domain and Range | Zeros |
| $$y=\sqrt{x}$$ |  |  |  |  |  |  |  |  |
| $$y=2^{x}$$ |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | Intervals of Increase | Intervals of Decrease | Odd or Even? | Horizontal/Vertical Asymptotes | End Behaviours | Continuous or Discontinuous | Domain and Range | Zeros |
| $$y=\sin(x)$$ |  |  |  |  |  |  |  |  |