Properties of Graphs of Functions (1.3)

Math Learning Target:

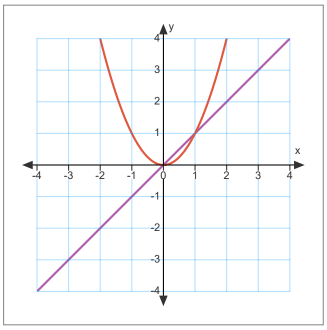
"I can compare properties between parent functions, and within a parent function's family."

A **transformation** is a geometric operation, such as a translation, reflection and compression.

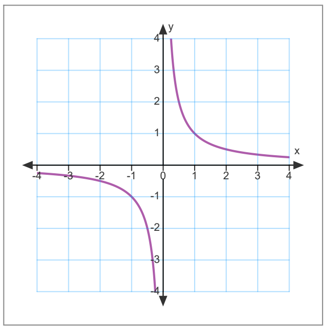
Each transformation is performed on a parent relation. There are very many parent relations. A **parent function** belongs to the set of parent relations and is the simplest function in a family of functions. For example, the family of quadratic functions are all constructed from $y = x^2$.

Here are the *seven* parent functions that will be used often...

$y = x$ $\quad\quad$ $y = x^2$



$y = \dfrac{1}{x}$ $\quad\quad$ $y = |x|$



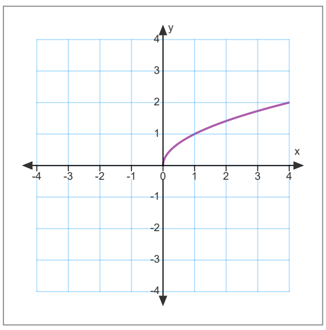
$y = x$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

$y = \dfrac{1}{x}$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

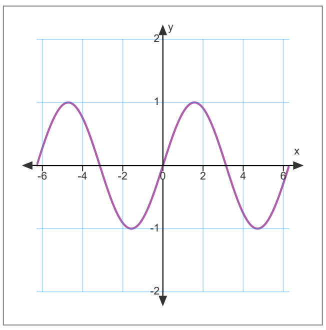
$y = x^2$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

$y = |x|$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

$y = \sqrt{x}$ $\quad\quad$ $y = b^x$ i.e. $b = 2$



$y = \sin(x)$



$y = \sqrt{x}$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

$y = \sin(x)$ End behaviours:

$y = 2^x$
Interval(s) of increase:
Interval(s) of decrease:
End behaviours:

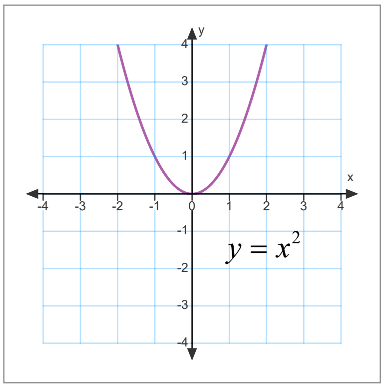
CHALLENGE! Can you determine expressions for the intervals of increase and intervals of decrease?

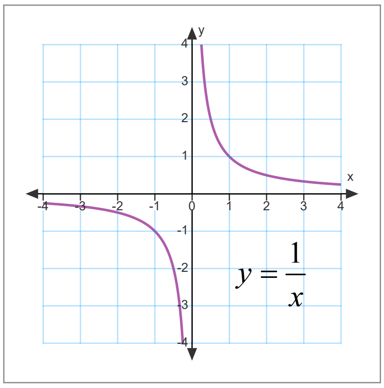
A function is **odd** when $f(-x) = -f(x)$

A function is **even** when $f(-x) = f(x)$

Example 1 Is $y = x^2$ even, odd, or neither? Prove algebraically.

Example 2 Is $y = \frac{1}{x}$ even, odd, or neither? Prove algebraically.





Graphically, a function is even when

Graphically, a function is odd when

Do: pg. 23 #3*, 4ad, 5**, 6, 7, 8, 10***, 15

* Error in answer: the function can be derived from <u>any</u> y=b^x, for any valid "b"),

** The instructions are poor. Simply apply what was learned today in the lesson.

***In #10a, in the <u>instructions</u> for the question change $(-\infty, -2)$ to $(-\infty, 2]$

positive 2

square bracket

YES, you have permission to write in the textbook to make this change!