

**Rationals: a, h and k**

The general form for simple rational functions is  $f(x) = \frac{a}{x-h} + k$       Parent function:  $f(x) = \frac{1}{x}$

**Let's focus on the "a" value first:**  $f(x) = \frac{a}{x}$

We saw that  $f(x) = \frac{24}{x}$  appears in quadrants 1 and 3. How do you think we could change this function to make it appear in quadrants 2 and 4?

**Class Conclusion:**

When the "a" value is

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**Practice. Make a sketch of each function without using your graphing calc.**

$$y = \frac{10}{x}$$

$$y = \frac{-3}{x}$$

$$y = -\frac{8}{x}$$

$$xy = 42$$

What are the asymptotes (imaginary lines that the function will never cross) for all four of the functions above?

Let's change the "h" value!!

$$f(x) = \frac{a}{x-h} + k$$

What do you think will happen to  $f(x) = \frac{1}{x}$  when we add or subtract from x?

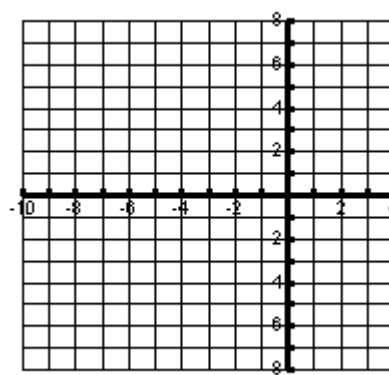
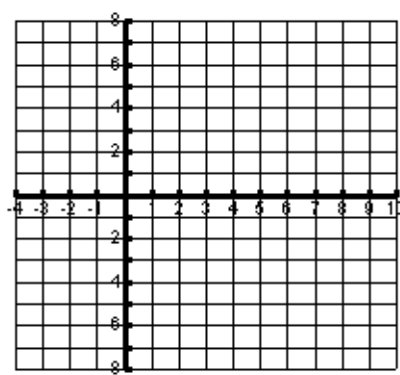
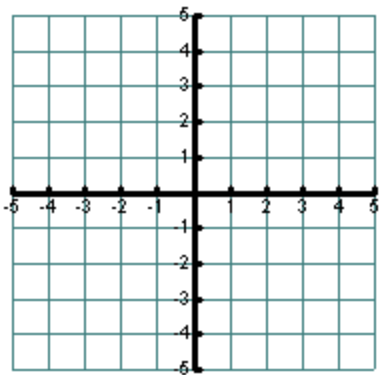
Examples from this year:

Graph these three functions on your calculator. Make a sketch of the function below include dotted lines for your asymptotes. **YOU MUST PUT PARENTHESES AROUND THE EXPRESSION IN THE DENOMINATOR!!**

1.  $f(x) = \frac{1}{x+2}$

2.  $f(x) = \frac{2}{x-5}$

3.  $f(x) = \frac{-3}{x+6}$



Class Conclusion:

When you add to the x it moves the graph \_\_\_\_\_

When you subtract from the x, it moves the graph \_\_\_\_\_

Sketch each of these **WITHOUT** your calculator. Put dotted lines in for your asymptotes.

1.  $f(x) = \frac{1}{x-1}$

2.  $f(x) = \frac{-2}{x+4}$

3.  $f(x) = \frac{10}{x+3}$

## Let's change the "k" value!!

$$f(x) = \frac{a}{x-h} + k$$

What do you think will happen to  $f(x) = \frac{1}{x}$  when we add or subtract at the end of the function?

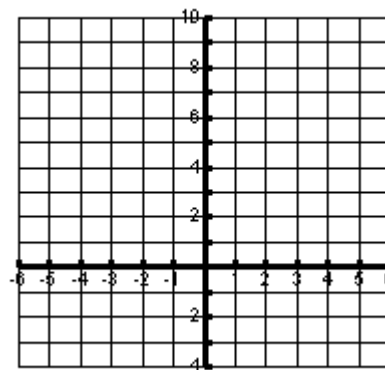
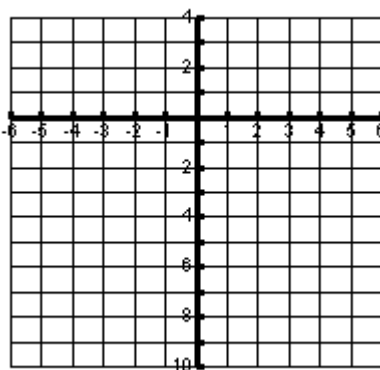
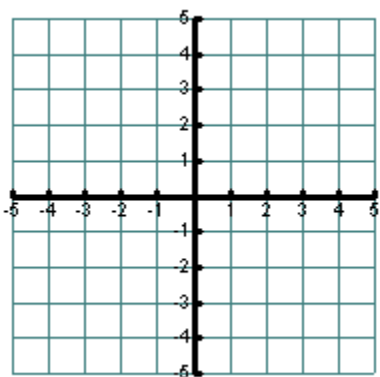
Examples from this year:

Graph these three functions on your calculator. Make a sketch of the function below.

1.  $f(x) = \frac{1}{x} + 2$

2.  $f(x) = \frac{1}{x} - 5$

3.  $f(x) = \frac{-1}{x} + 6$



Class Conclusion:

When you add to the end of the function it moves the graph \_\_\_\_\_

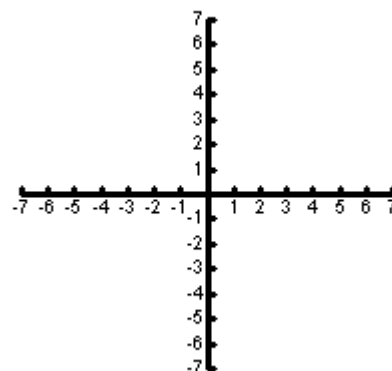
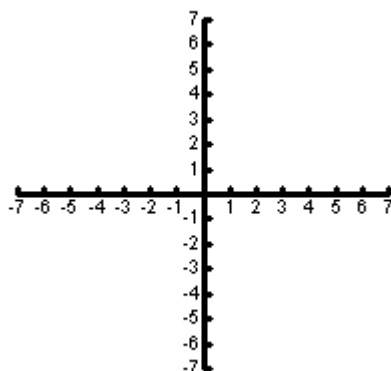
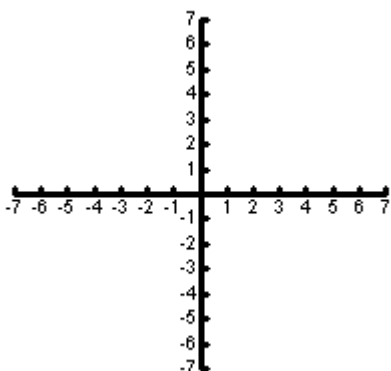
When you subtract from the end of the function, it moves the graph \_\_\_\_\_

Without using your graphing calculator make a sketch of each rational function. Use dotted lines to represent your two asymptotes.

A.  $f(x) = \frac{1}{x+2} + 3$

B.  $f(x) = \frac{-1}{x-2} - 4$

C.  $f(x) = \frac{1}{x-5} + 3$



Equations for asymptotes:

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