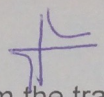
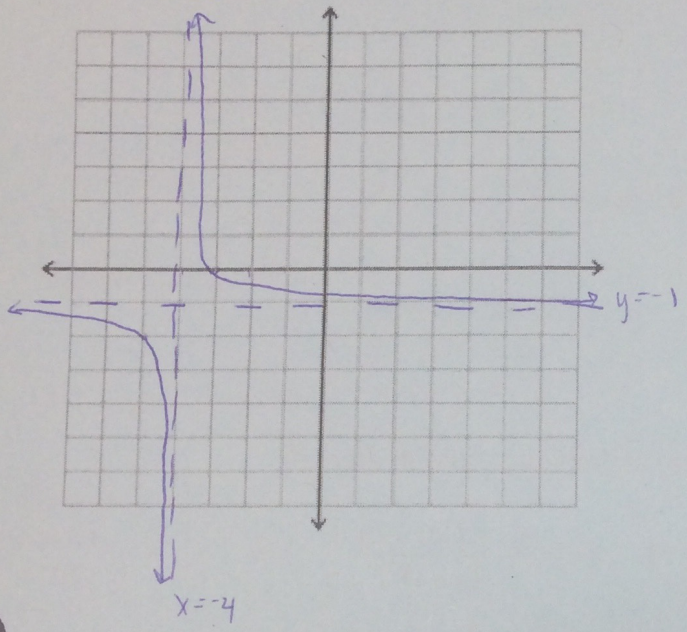
Secondary III
Unit 5 Review

Name: Key

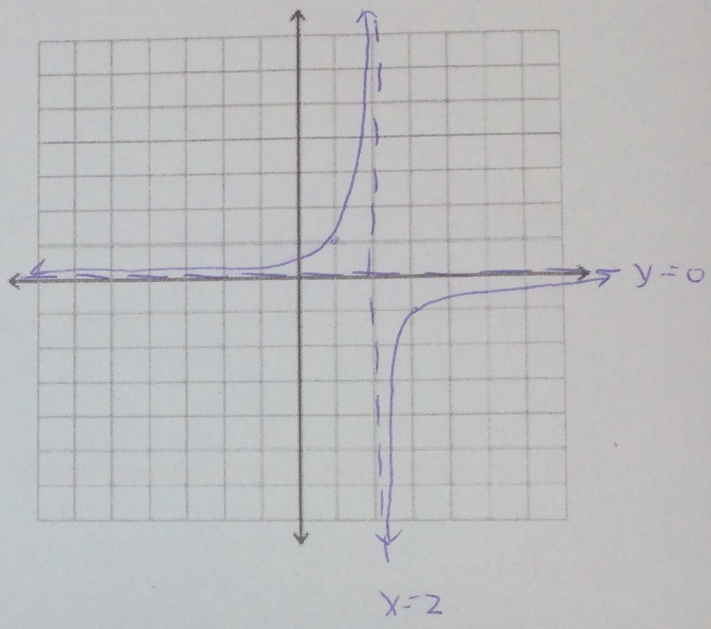
$\frac{1}{x}$:  $\frac{1}{x^2}$: 

(5-1)Graph the following from the transformations

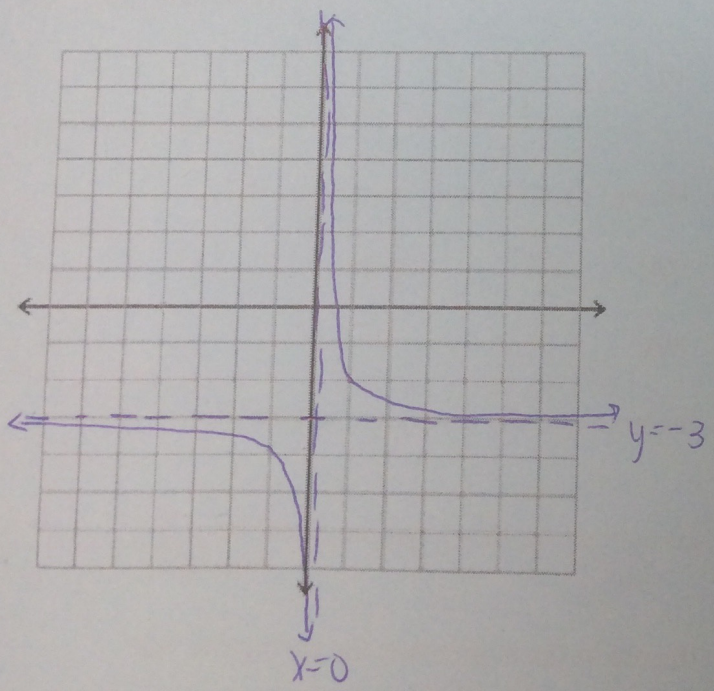
1. $f(x)=\frac{1}{x+4}-1$ Shift Left 4, Shift Down 1



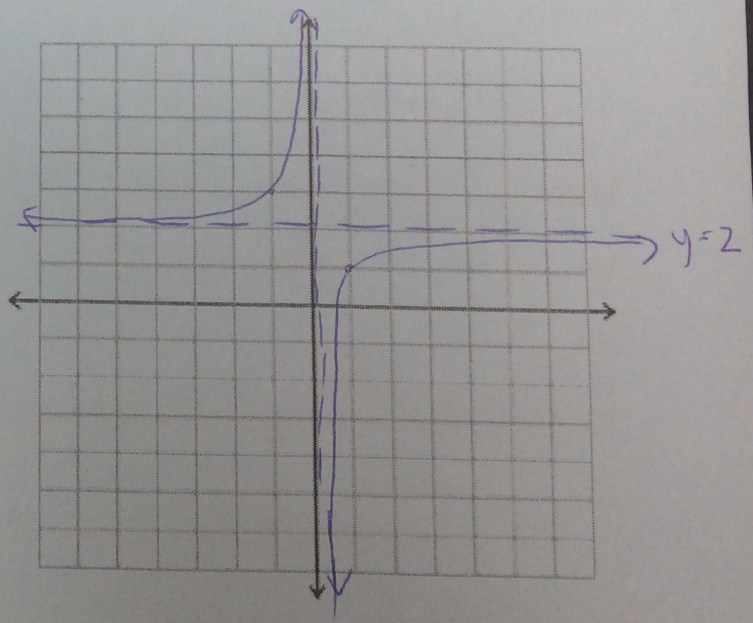
2. $f(x)=-\frac{1}{x-2}$ V. Flip, Shift Right 2



3. $f(x)=\frac{1}{x}-3$ Shift Down 3



4. $f(x)=-\frac{1}{x}+2$ V. Flip, Shift Up 2



(5-2). Use division to put into transform form (if necessary) then describe the transformations of g(x) from $f(x)=\frac{1}{x}$.

5. $g(x)=\frac{1}{x+2}-3$

Transformations:
- Shift Left 2
- Shift Down 3

6. $g(x)=-\frac{1}{x}+5$

Transformations:
· V. Flip
· Shift Up 5

7. $g(x)=\frac{3x+1}{x-2}$

2| 3 1
↓ 6
3 |7

$g(x)=\frac{7}{x-2}+3$

Transformations:
- V. Stretch by 7
- Shift Right 2
- Shift Up 3

8. $g(x)=\frac{x+2}{x-1}$

1| 1 2
↓ 1
1 |3

$g(x)=\frac{3}{x-1}+1$

Transformations:
· V. Stretch by 3
· Shift Right 1
· Shift Up 1

(5-3). Given the following functions, find all holes, asymptotes, and intercepts.

9. $f(x)=\frac{x-3}{(x+1)(x+5)}$ =0 (x-int) =0 (VA)

(y-int) $\frac{0-3}{(0+1)(0+5)}=\frac{-3}{5}$

Holes: None x-int: (3,0)

VA: x=-1, -5 y-int: (0, -3/5)

HA: y=0
(bottom heavy)

10. $f(x)=\frac{(x+2)(x-2)}{(x+1)}$ =0 =0

$\frac{(0+2)(0-2)}{0+1}=\frac{2(-2)}{1}=-4$

Holes: None x-int: (-2,0), (2,0)

VA: x=-1 y-int: (0,-4)

~~HA~~: Slant Asymptote (top Heavy)

11. $f(x)=\frac{(x+4)(x-5)}{(x-5)(x+1)}=\frac{x+4}{x+1}$

Holes: x=5 x-int: (-4,0)

VA: x=-1 y-int: (0,4)

HA: y=1
equal: compare coefficients: $\frac{1}{1}$

12. $f(x)=\frac{x-1}{x+4}$

Holes: None x-int: (1,0)

VA: x=-4 y-int: (0,-1/4)

HA: y=1
equal: compare coefficients

13. If the degree is the same in the numerator and denominator, the asymptote will be $y=\frac{\text{coefficient on top}}{\text{coefficient on bottom}}$
↑ or factors ↑ equal

14. If the degree in the denominator is larger than the numerator, they asymptote will be ~~[illegible]~~ y=0
↑ or factors bottom heavy ~~[illegible]~~

~~15~~. If the degree in the numerator is larger than the degree in the numerator, the asymptote will be ~~[illegible]~~ Slant.
top heavy

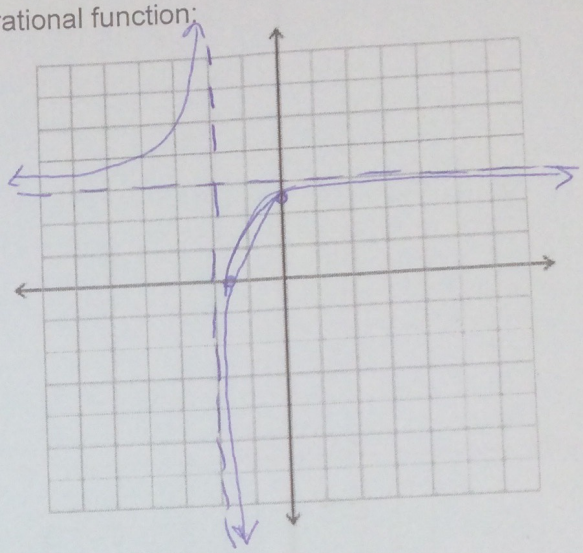
(5-3). Find the following information and graph each rational function:

16. $f(x)=\dfrac{3x+5}{x+2}$ $=0$ x-int; $=0$ VA

x-int: $3x+5=0$, $-5\ -5$, $\frac{3x}{3}=\frac{-5}{3}$, $x=-5/3$

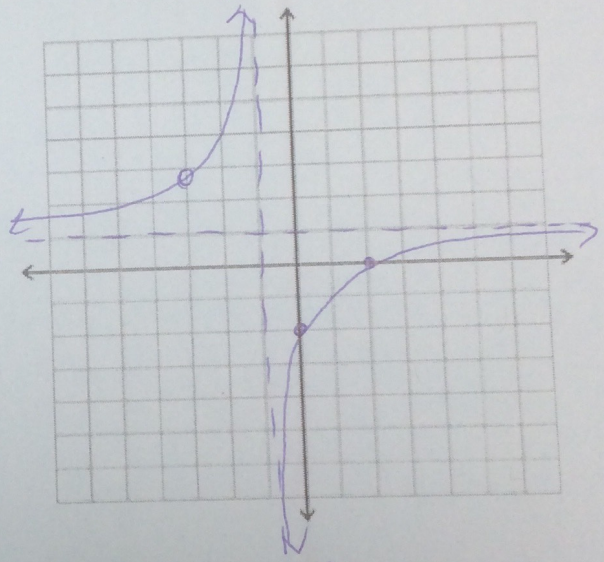
y-int: $\frac{3(0)+5}{0+2}=\frac{5}{2}$

Domain: $(-\infty,-2)\cup(-2,\infty)$
Range: $(-\infty,3)\cup(3,\infty)$
x- int: $(-5/3,0)$
y-int: $(0,5/2)$
Vertical Asymptote: $x=-2$
Horizontal ~~End Behavior~~ Asymptote: $y=3$ ← Degree: equal so $\frac{3}{1}=3$
End Behavior:
As $x\to-\infty$, $y\to3$
As $x\to+\infty$, $y\to3$
~~Asymptote Behavior:~~



17. $f(x)=\dfrac{(x-2)(x+3)}{(x+1)(x+3)}$ $\frac{x-2}{x+1}=0$ x-int; $=0$ VA

Hole: $x=-3$
Domain: $(-\infty,-3)\cup(-3,-1)\cup(-1,\infty)$
y-int: $\frac{0-2}{0+1}=\frac{-2}{1}=-2$
Range: $(-\infty,1)\cup(1,\infty)$
x- int: $(2,0)$
y-int: $(0,-2)$
Vertical Asymptote: $x=-1$
Horizontal ~~End Behavior~~ Asymptote: $y=1$
End Behavior:
As $x\to-\infty$, $y\to1$
As $x\to+\infty$, $y\to1$
~~Asymptote Behavior~~:



18. $f(x)=\dfrac{2x-6}{x-1}$ $=\dfrac{2(x-3)}{x-1}=0$

Domain: $(-\infty,1)\cup(1,\infty)$
Range: $(-\infty,2)\cup(2,\infty)$
x- int: $(3,0)$
y-int: $(0,6)$
Vertical Asymptote: $x=1$
Horizontal End Behavior: $y=2$
End Behavior:
As $x\to-\infty$, $y\to2$
As $x\to+\infty$, $y\to2$
~~Asymptote Behavior~~