Pre-Calc
Review 2.5-2.7

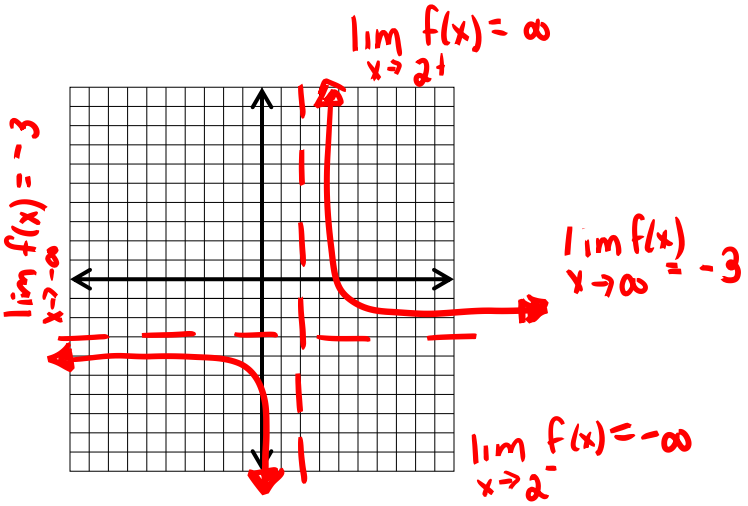
Name Key
Date _____ Period _____

For questions 1 – 2 sketch a graph of the function *without* the aid of a calculator. Find all asymptotes and intercepts. Describe using limit notation what it happening as x $\to \pm\infty$ and on each side of the vertical asymptote. (HINT – Think about TRANSFORMATIONS on the reciprocal function.)

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

vertical
* shift down 3
HA $y = -3$

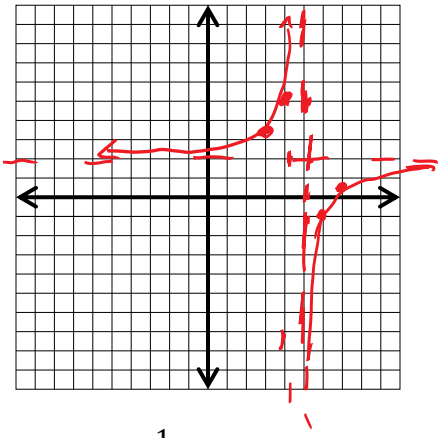
horizontal
* shift right 2
VA $x = 2$



2) $f(x) = 2 - \frac{3}{x-5}$ = $2 - 3\left(\frac{1}{x-5}\right)$

vertical
* stretch ratio 3
* reflect over x-axis
* up 2

horiz
Right 5

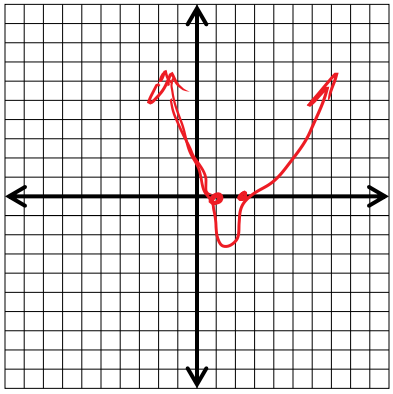


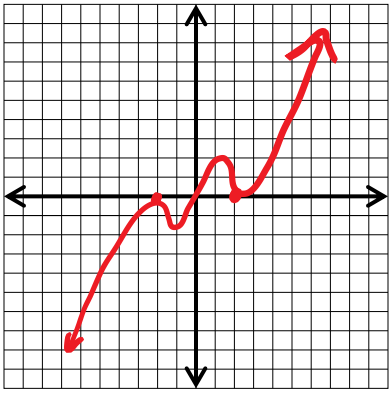
3) $g(x) = (x^2+4)(x-1)(x-2)^3$

$x^2 \cdot x \, x^3 = x^6$

4) $g(x) = \frac{1}{10}x(16-x^4)^2$

Degree 9
↑
↓





For questions 5 - 6, factor and find all possible zeros and write as linear factors. (Express zeros in exact form.) You will need your calculator to find the real zeros from the graph to begin each problem.

5) $f(x)=x^3+4x-5$

Find x-int. on calc

1 | 1 0 4 −5
↓ 1 1 5
1 1 5 | 0

$x^2+x+5=0$

$x=\frac{-1\pm\sqrt{1-4(5)}}{2}$

$x=\frac{-1\pm i\sqrt{19}}{2}$

$f(x)=(x-1)\left(x-\left(\frac{-1+i\sqrt{19}}{2}\right)\right)\left(x-\left(\frac{-1-i\sqrt{19}}{2}\right)\right)$

6) $f(x)=x^3-10x^2+44x-69$

3 | 1 −10 44 −69
↓ 3 −21 69
1 −7 23 | 0

$x=\frac{7\pm\sqrt{49-92}}{2}$

$x=\frac{7\pm\sqrt{-43}}{2}$

$x=\frac{7\pm i\sqrt{43}}{2}$

$f(x)=(x-3)\left(x-\left(\frac{7+i\sqrt{43}}{2}\right)\right)\left(x-\left(\frac{7-i\sqrt{43}}{2}\right)\right)$

For questions 7-8, use the given zero to find all of the zeros.

7) $3-i$ is a zero of $f(x)=x^4-6x^3+14x^2-24x+40$

$-(3-i+3+i)=-6$

$(3-i)(3+i)=10$

$x^2-6x+10 \overline{)\, x^4-6x^3+14x^2-24x+40}$

x^2+4

$-(x^4-6x^3+10x^2)$

$4x^2-24x+40$

$-(4x^2-24x+40)$

0

zeros:

$x=3\pm i$

$x=\pm 2i$

8) $-\sqrt{5}$ is a zero of $g(x)=x^4-4x^2-5$

$-\sqrt{5}$ | 1 0 −4 0 −5
$-\sqrt{5}$ 5 $-\sqrt{5}$ 5
$\sqrt{5}$ | 1 $-\sqrt{5}$ 1 $-\sqrt{5}$ | 0
$\sqrt{5}$ 5 $\sqrt{5}$
1 0 1 0

$x^2+1=0$

$x=\pm\sqrt{-1}$

$x=\pm i$

Find the intercepts, vertical asymptotes, and end behavior asymptotes, and then graph the function.

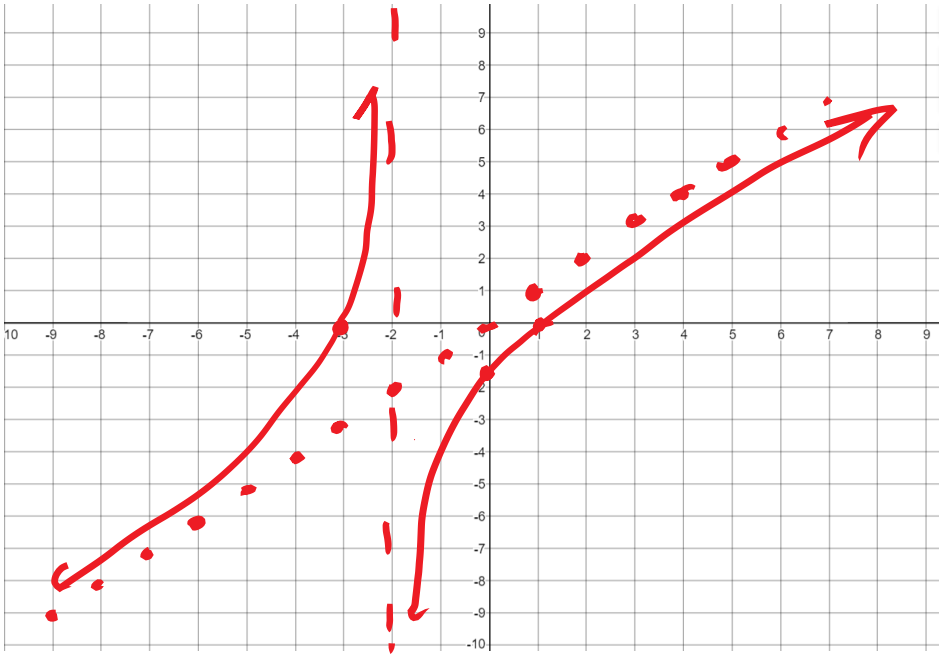
9) $f(x)=\dfrac{x^2+2x-3}{x+2}$

$f(x)=\dfrac{(x+3)(x-1)}{x+2}$

x-int. $(-3,0)$ $(1,0)$

VA $x=-2$

y-int $(0,-1.5)$



-2 | 1 2 -3
-2 0
1 0 -3

end behavior $y=x$

10) Find the given limits of $f(x)=\dfrac{x^4+1}{x+1}$:

$\lim_{x\to\infty} f(x)=\infty$

$\lim_{x\to-\infty} f(x)=-\infty$

$\lim_{x\to-1^-} f(x)=-\infty$

$\lim_{x\to-1^+} f(x)=\infty$

-1 | 1 0 0 0 1
-1 1 -1 1
1 -1 1 -1 2

x^3

- This review may not cover all of 2.5-2.6. I recommend you look through your homework, openers, and notes to ensure you are familiar with all the concepts covered.