Name _____ Period _____ Date _____

Precalculus: 2.6 & 2.7 Review

Find the end behavior asymptote (horizontal or slant asymptote) and the vertical asymptote of each function. also find x and y intercepts. Do not use a calculator.

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

vert. asy: $x=3$
horizontal: $y=0$
x-int: none
y-int: $(0,-\frac{1}{3})$

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

Hint: ↑ vertical shift up 2
or
$2+\frac{1}{x}=\frac{2x+1}{x}$

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

vert: $x=4$
slant: $y=x+5$
x-int: none
y-int: $(0,-1/2)$

4. $f(x)=\frac{2x-3}{x^2+3x+2}$

5. $f(x)=\frac{3x+6}{x^2+16}$

vertical: none
horizontal: $y=0$
x-int: $3x+6=0$, $x=-2$, $(-2,0)$
y-int: $(0,3/8)$

6. $f(x)=\frac{4x^2+7}{(2x+1)(x-4)}$

7. $f(x)=\frac{4x^2}{x^2+1}$

vertical: none
horizontal: $y=4$
x-int.: $(0,0)$
y-int: $(0,0)$

8. $f(x)=\frac{x^3-5x+3}{x^2-9}$

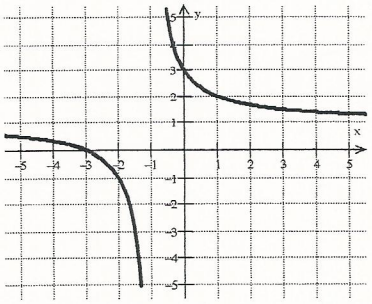
9. $f(x)=\frac{x^2-4}{x^2+6x+8}=\frac{(x+2)(x-2)}{(x+2)(x+4)}$

vert: $x=-4$
hole: $(-2,-2)$
hor: $y=1$
x-int: $(2,0)$
y-int: $(0,-1/2)$

↑ removeable discontinuity @ $x=-2$

State the **domain and range** of each function. Then evaluate the limits.

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



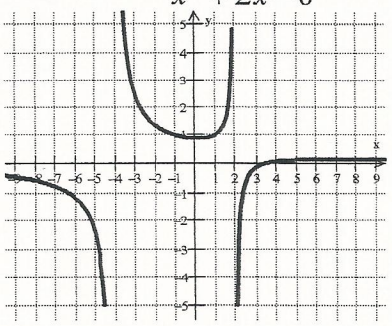
D = _____

R = _____

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

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

11. $f(x)=\frac{2x-7}{x^2+2x-8}$



D = $(-\infty,-4)\cup(-4,2)\cup(2,\infty)$

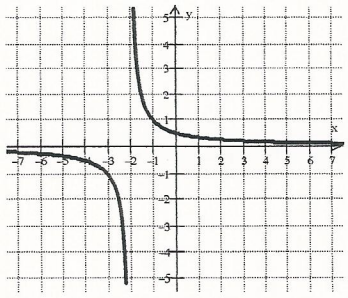
R = _____

$\lim_{x\to -4^+} f(x)=\infty$ $\lim_{x\to -4^-} f(x)=-\infty$

$\lim_{x\to 2^+} f(x)=-\infty$ $\lim_{x\to 2^-} f(x)=\infty$

$\lim_{x\to \infty} f(x)=0$ $\lim_{x\to -\infty} f(x)=0$

12. $f(x)=\frac{x-3}{x^2-x-6}$



D = _____

R = _____

$\lim_{x\to -2^+} f(x) =$ $\lim_{x\to -2^-} f(x) =$

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

Solve each equation. Check for extraneous solutions.

13. $\frac{2x}{3}+x=\frac{5}{3x}$

LCD: $3x$

$3x\left(\frac{2x}{3}+x=\frac{5}{3x}\right) = 2x^2+3x^2=5$

$5x^2=5$

$x^2=1$

$x=\pm 1$

CHeck:

$x=1$

$\frac{2(1)}{3}+(1)\stackrel{?}{=}\frac{5}{3(1)}$

$\frac{2}{3}+\frac{3}{3}=\frac{5}{3}$ ✓

$x=-1$

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

$-\frac{2}{3}-1=-\frac{5}{3}$ ✓

$\boxed{x=\pm 1}$

14. $\frac{3}{x-3}+\frac{2x}{x^2-9}=\frac{4x}{x+3}$

15. $\frac{x^2+8x+20}{x+4}=5$

LCD: $x+4$

$\times(x+4)\left(\frac{x^2+8x+20}{x+4}\right)=(5)(x+4)$

$x^2+8x+20=5(x+4)$

$x^2+8x+20=5x+20$

$-5x-20 \quad -5x-20$

$x^2+3x=0$

$x(x+3)=0$

$x=0 \quad x=-3$

CHECK:

$x=0$

$\frac{0^2+8(0)+20}{0+4}\stackrel{?}{=}5$

$\frac{20}{4}=5$ ✓

$x=-3$

$\frac{9+8(-3)+20}{(-3)+4}\stackrel{?}{=}5$

$\frac{9-24+20}{1}\stackrel{?}{=}5$

$\frac{5}{1}=5$ ✓

$\boxed{x=0,\ x=-3}$

16. $\frac{x}{x+2}+\frac{5}{x-3}=\frac{25}{x^2-x-6}$