Advanced Algebra with Trig
8.2, 8.4, 8.5 Review

Name:
Period: Key

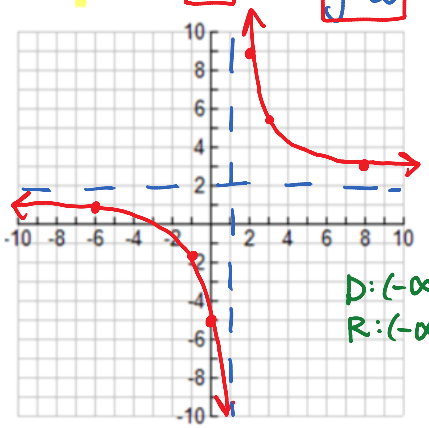
Checkpoints!

Graph the following rational expressions. Identify the equations of the asymptotes, domain and range.

1. $y = \frac{2x+5}{x-1}$

vertical $x-1=0$, $x=1$

horizontal $y=\frac{2}{1}$, $y=2$

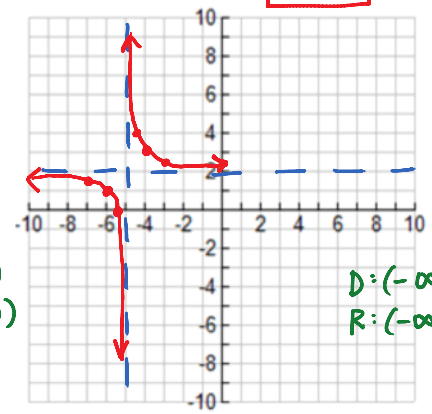


D: $(-\infty,1) \cup (1,\infty)$
R: $(-\infty,2) \cup (2,\infty)$

2. $y = \frac{1}{x+5} + 2$

vertical $x+5=0$, $x=-5$

horizontal $y=2$



D: $(-\infty,-5) \cup (-5,\infty)$
R: $(-\infty,2) \cup (2,\infty)$

Perform the indicated operation. Simplify the result.

3. $\frac{3x+27}{6x-48} \div \frac{x^2+9x}{x^2-4x-32}$

$\frac{3(x+9)}{6(x-8)} \cdot \frac{(x-8)(x+4)}{x(x+9)}$

$\frac{3(x+4)}{2 \cdot 8x} = \frac{x+4}{2x}$

4. $\frac{x-3}{2x-8} \cdot \frac{6x^2-96}{x^2-9}$

$\frac{x-3}{2(x-4)} \cdot \frac{6(x^2-16)}{(x+3)(x-3)}$

$\frac{1}{2(x-4)} \cdot \frac{3\,6(x+4)(x-4)}{(x+3)}$

$\frac{3(x+4)}{(x+3)}$

Perform the indicated operation. Simplify the result.

5. $\frac{3x^4+12x^3+7x^2-1}{x+3}$

$-3 \mid 3 \quad 12 \quad 7 \quad 0 \mid -1$
$\quad\quad\downarrow \quad -9 \quad -9 \quad 6 \mid -18$
$\quad\quad 3 \quad 3 \quad -2 \quad 6 \mid -19$

$3x^3+3x^2-2x+6+\frac{-19}{x+3}$

6. $\frac{3x^4+12x^3+7x^2-1}{x^2+3}$

$3x^2+12x-2+\frac{-36x+5}{x^2+3}$

$x^2+0x+3 \;\overline{)\; 3x^4+12x^3+7x^2+0x-1}$
$-(3x^4+0x^3+9x^2)$
$12x^3-2x^2+0x$
$-(12x^3+0x^2+36x)$
$-2x^2-36x-1$
$-(-2x^2+0x-6)$
$-36x+5$

$\dfrac{-(-2x^2+0x-6)}{-36x+5}$

Perform the indicated operation and simplify.

7. $\dfrac{5x}{x+8}+\dfrac{4x-9}{x^2+5x-24}$

$\dfrac{x-3}{x-3}\cdot\dfrac{5x}{x+8}+\dfrac{4x-9}{(x+8)(x-3)}$

$\dfrac{5x(x-3)+4x-9}{(x-3)(x+8)}$

$\dfrac{5x^2-15x+4x-9}{(x-3)(x+8)}$

$\boxed{\dfrac{5x^2-11x-9}{(x-3)(x+8)}}$

8. $\dfrac{x+2}{x^2+4x+3}-\dfrac{5x}{x^2-9}$

$\dfrac{(x-3)}{(x-3)}\cdot\dfrac{x+2}{(x+3)(x+1)}-\dfrac{5x}{(x+3)(x-3)}\cdot\dfrac{(x+1)}{(x+1)}$

$\dfrac{(x-3)(x+2)-5x(x+1)}{(x-3)(x+1)(x+3)}$

$\dfrac{x^2+2x-3x-6-5x^2-5x}{(x-3)(x+1)(x+3)}$

$\dfrac{-4x^2-6x-6}{(x-3)(x+1)(x+3)}$

$\boxed{\dfrac{-2(2x^2+3x+3)}{(x-3)(x+1)(x+3)}}$

Simplify the complex fraction.

9. $\dfrac{\left[\dfrac{3}{x+5}\right]}{\left[\dfrac{2}{x-3}+\dfrac{1}{x+5}\right]}$

$\dfrac{x+5}{x+5}\cdot\dfrac{x-3}{x-3}$

$\dfrac{\dfrac{3}{x+5}}{\dfrac{2(x+5)+(x-3)}{(x+5)(x-3)}}$

$\dfrac{3}{x+5}\cdot\dfrac{(x+5)(x-3)}{2(x+5)+(x-3)}$

$\dfrac{3(x-3)}{2x+10+x-3}\Rightarrow\boxed{\dfrac{3(x-3)}{3x+7}}$

10. $\dfrac{\left[\dfrac{1}{3x^2-3}\right]}{\left[\dfrac{5}{x+1}-\dfrac{x+4}{x^2-3x-4}\right]}$

$\dfrac{x-4}{x-4}$ ↑ $(x-4)(x+1)$

$\dfrac{\dfrac{1}{3(x^2-1)}}{\dfrac{5(x-4)-(x+4)}{(x-4)(x+1)}}$

$\dfrac{1}{3(x+1)(x-1)}\cdot\dfrac{(x-4)(x+1)}{5x-20-x-4}$

$\dfrac{x-4}{3(x-1)\underbrace{(4x-24)}_{4(x-6)}}=\boxed{\dfrac{x-4}{12(x-1)(x-6)}}$

$4(x-6)$