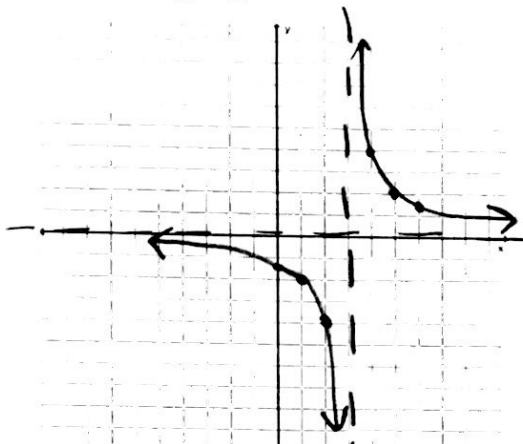


Chapter 8 Review Worksheet

Name: KEY

Graph the function. Identify the graph's asymptotes and the function's domain and range.

1.) $y = \frac{4}{x-3}$



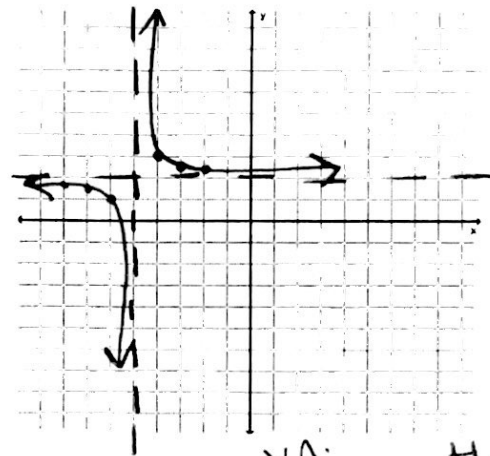
X	y
0	-1.3
1	-2
2	-4
3	-
4	4
5	2
6	1.3

asymptotes: VA: $x=3$ HA: $y=0$

domain: $\mathbb{R}, x \neq 3$

range: $\mathbb{R}, y \neq 0$

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



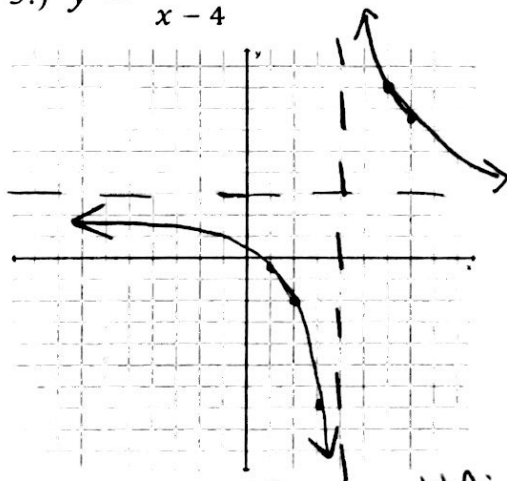
X	y
-8	1.7
-7	1.5
-6	1
-5	-
-4	3
-3	2.5
-2	2.3

asymptotes: VA: $x=-5$ HA: $y=2$

domain: $\mathbb{R}, x \neq -5$

range: $\mathbb{R}, y \neq 2$

3.) $y = \frac{3x-2}{x-4}$



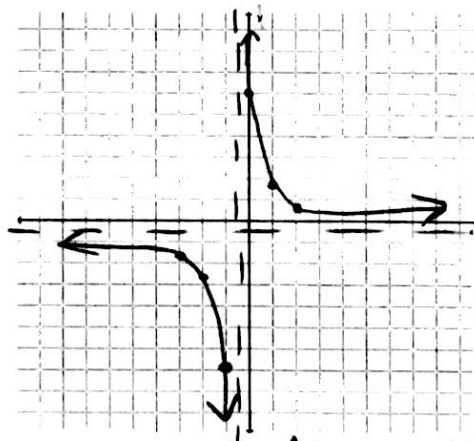
X	y
1	-0.3
2	-2
3	-7
4	-
5	13
6	8
7	6.3

asymptotes: VA: $x=4$ HA: $y=3$

domain: $\mathbb{R}, x \neq 4$

range: $\mathbb{R}, y \neq 3$

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



X	y
-3	4.8
-2	-2.7
-1	-7.7
-1/2	-
0	6
1	1.7
2	0.8

asymptotes: VA: $x=-1/2$ HA: $y=-1/2$

domain: $\mathbb{R}, x \neq -1/2$

range: $\mathbb{R}, y \neq -1/2$

Simplify the rational expression, if possible.

$$5.) \frac{x^2 + 2x - 24}{x^2 + 7x + 6}$$

$$\frac{(x+6)(x-4)}{(x+6)(x+1)}$$

$$\boxed{\frac{x-4}{x+1}}$$

$$6.) \frac{3x^3 + 6x^2 + 12x}{x^3 - 8}$$

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

$$\boxed{\frac{3x}{x-2}}$$

$$7.) \frac{x^2 + 4x - 5}{x^2 - 25}$$

$$\frac{(x+5)(x-1)}{(x+5)(x-5)}$$

$$\boxed{\frac{x-1}{x-5}}$$

Multiply or divide the expressions. Simplify the result.

$$8.) \frac{80x^4y}{y^3} \cdot \frac{xy}{5x^2}$$

$$\frac{5 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot y}{y \cdot y \cdot y} \cdot \frac{x \cdot y}{5 \cdot x \cdot x}$$

$$\frac{\cancel{5} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot y \cdot y}{\cancel{5} \cdot \cancel{x} \cdot \cancel{x} \cdot y \cdot y \cdot y}$$

$$\boxed{\frac{16x^3}{y}}$$

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

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

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

$$\frac{3 \cdot \cancel{2} \cdot (x+4)(x-4)(x-3)}{\cancel{2} \cdot (x-4)(x+3)(x-3)}$$

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

$$10.) \frac{x^2 + 12x + 36}{x^2 - 8x + 12} \cdot (x^2 - 36)$$

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

$$\frac{(x+6)(x+6)(x+6)(x-6)}{(x-6)(x-2)}$$

$$\boxed{\frac{(x+6)^3}{x-2}}$$

$$11.) \frac{3x^2y}{4x^3y^5} \div \frac{6y^2}{2xy^3}$$

$$\frac{3x^2y}{4x^3y^5} \cdot \frac{2xy^3}{6y^2}$$

$$\frac{3 \cdot x \cdot x \cdot y}{2 \cdot 2 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y} \cdot \frac{2 \cdot x \cdot y \cdot y \cdot y}{3 \cdot 2 \cdot y \cdot y}$$

$$\frac{\cancel{3} \cdot \cancel{2} \cdot \cancel{x} \cdot \cancel{x} \cdot y \cdot y \cdot y \cdot y}{\cancel{2} \cdot \cancel{2} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot y \cdot y \cdot y \cdot y \cdot y}$$

$$\boxed{\frac{1}{4y^3}}$$

$$12.) \frac{16x^2 - 8x + 1}{x^3 - 7x^2 + 12x} \div \frac{20x^2 - 5x}{15x^3}$$

$$\frac{16x^2 - 8x + 1}{x^3 - 7x^2 + 12x} \cdot \frac{15x^3}{20x^2 - 5x}$$

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

$$\frac{(4x-1)(4x-1)}{x(x-4)(x-3)} \cdot \frac{5 \cdot 3 \cdot x \cdot x \cdot x}{5x(4x-1)}$$

$$\frac{\cancel{5} \cdot \cancel{3} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot (4x-1)(4x-1)}{\cancel{5} \cdot \cancel{x} \cdot \cancel{x} \cdot (x-4)(x-3)(4x-1)}$$

$$\boxed{\frac{3x(4x-1)}{(x-4)(x-3)}}$$

$$13.) \frac{6x^2 + x - 15}{4x^2} \div (3x^2 + 5x)$$

$$\frac{6x^2 + x - 15}{4x^2} \cdot \frac{1}{3x^2 + 5x}$$

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

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

$$\boxed{\frac{2x-3}{4x^3}}$$

Perform the indicated operation(s) and simplify.

$$14.) \frac{3x}{x+5} - \frac{4x+1}{x+5}$$

$$\frac{-x-1}{x+5}$$

$$\boxed{\frac{-1(x+1)}{x+5}}$$

$$15.) \frac{8}{3x^2} - \frac{5}{4x}$$

$$3 \cdot x \cdot x \quad 2 \cdot 2 \cdot x$$

$$LCD: 3 \cdot x \cdot x \cdot 2 \cdot 2 = 12x^2$$

$$\frac{8 \cdot 4}{12x^2} - \frac{5 \cdot 3x}{12x^2}$$

$$\frac{32}{12x^2} - \frac{15x}{12x^2}$$

$$\boxed{\frac{32-15x}{12x^2}}$$

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

$$LCD: (x-3)(x+6)$$

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

$$\frac{4x+24}{(x-3)(x+6)} + \frac{2x-6}{(x-3)(x+6)}$$

$$\frac{6x+18}{(x-3)(x+6)}$$

$$\boxed{\frac{6(x+3)}{(x-3)(x+6)}}$$

$$18.) \frac{4}{x+5} + \frac{2x}{x^2-25}$$

$$(x+5)(x-5)$$

$$\frac{4(x-5)}{(x+5)(x-5)} + \frac{2x}{(x+5)(x-5)}$$

$$\frac{4x-20}{(x+5)(x-5)} + \frac{2x}{(x+5)(x-5)}$$

$$\frac{6x-20}{(x+5)(x-5)}$$

$$\boxed{\frac{2(3x-10)}{(x+5)(x-5)}}$$

$$17.) \frac{3x}{x^2+x-12} - \frac{6}{x+4}$$

$$(x+4)(x-3)$$

$$LCD: (x+4)(x-3)$$

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

$$\frac{3x}{(x+4)(x-3)} - \frac{6x-18}{(x+4)(x-3)}$$

$$\frac{-3x+18}{(x+4)(x-3)}$$

$$\boxed{\frac{-3(x-6)}{(x+4)(x-3)}}$$

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

$$x \quad (x-2) \quad x \cdot x$$

$$LCD: x \cdot x \cdot (x-2) = x^2(x-2)$$

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

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

$$\boxed{\frac{5x^2-8x+4}{x^2(x-2)}}$$

Simplify the complex fraction.

20.) ~~$\frac{\frac{2}{x} - 4}{\frac{2}{x} + 3}$~~

21.) ~~$\frac{\frac{3}{x-2} - \frac{6}{x^2-4}}{\frac{3}{x+2} + \frac{1}{x-2}}$~~

Solve the equation. Check for extraneous solutions.

22.) ~~$\frac{2x}{9} = \frac{2}{x}$~~
 $2x^2 = 18$
 $x^2 = 9$
 $x = \pm 3$

23.) ~~$\frac{6}{x+2} = \frac{x-3}{2x+4}$~~
 $6(2x+4) = (x+2)(x-3)$
 $12x+24 = x^2-x-6$
 $x^2-13x-30=0$
 $(x-15)(x+2)=0$
 $x=15$ | ~~$x=-2$~~ extraneous

24.) ~~$\frac{x+12}{3} = \frac{2x+3}{x+2}$~~
 $(x+12)(x+2) = 3(2x+3)$
 $x^2+14x+24 = 6x+9$
 $x^2+8x+15=0$
 $(x+5)(x+3)=0$
 $x=-5$ | $x=-3$

25.) LCD: $(x-2)$
 ~~$\frac{x-4}{x-2} - \frac{2x-1}{x-2} = 2$~~
 $\frac{x-4}{x-2} - \frac{2x-1}{x-2} = (x-2) \cdot 2$
 $x-4-(2x-1) = 2x-4$
 $-x-3 = 2x-4$
 $1 = 3x$
 $x = \frac{1}{3}$

26.) ~~$\frac{x-1}{x} + \frac{2x-1}{x+3} = \frac{x+6}{x+3}$~~ LCD: $x(x+3)$
 $\frac{x-1}{x} + \frac{2x-1}{x+3} = \frac{x+6}{x+3}$
 $x^2-2x-3 + 2x^2-x = x^2+6x$
 $2x^2-5x-3=0$
 $(x-3)(2x+1)=0$
 $x=3$ | $x=-\frac{1}{2}$
 $2 \cdot -3 = -6$
 $-6+1 = -5$
 $2x^2-6x+1x-3$
 $2x(x-3)+1(x-3)$
 $(x-3)(2x+1)$

27.) ~~$\frac{5}{x} + \frac{x+1}{x+2} = \frac{2x+9}{x+2}$~~ LCD: $x(x+2)$
 $\frac{5}{x} + \frac{x+1}{x+2} = \frac{2x+9}{x+2}$
 $5x+10+x^2+x = 2x^2+9x$
 $x^2+3x-10=0$
 $(x+5)(x-2)=0$
 $x=-5$ | $x=2$

28.) ~~$\frac{1}{x+6} + \frac{x+1}{x} = \frac{13}{x+6}$~~ LCD: $x(x+6)$
 $\frac{1}{x+6} + \frac{x+1}{x} = \frac{13}{x+6}$
 $x+x^2+7x+6 = 13x$
 $x^2-5x+6=0$
 $(x-3)(x-2)=0$
 $x=3$ | $x=2$