GSE Algebra II – Unit 4C Review #2
Rational Functions

Name _____
Date _____ Day ____

1. Does $f(x)=\frac{x^3-2x^2+3}{x^2-1}$ have a slant asymptote? Where?

Yes $y = x-2$

$-1 \mid 1 \;\; -2 \;\; 0 \;\; 3$ → $1 \;\; -3 \;\; 3 \;\; 0$ $\quad 1 \mid 1 \;\; -3 \;\; 3$ → $1 \;\; -2 \;\; 1$

2. Write a rational function with Vertical Asymptotes at x = 2 and x = -3 and a horizontal asymptote at y = 0 and an x-intercept at (4, 0)

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

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

3. What is the coordinates of the hole for the function $f(x)=\frac{x^2-4}{x^2+2x-8}$ $\quad \frac{x-2}{x+4} \; \frac{x+2}{x-2}$

$(2, 2/3)$

4. What are the x-int, y-int, vertical asymptote and horizontal asymptote for $g(x)=\frac{(x-3)(x+2)}{(x+2)(x+1)}$

x-int: $(3, 0)$ y-int: $(0, -3)$

VA: $x = -1$ HA: $y = 1$

5. What is the slant asymptote for $g(x)=\frac{x^2-9x+20}{x+4}$? $\quad x-4 \;\; x-5$

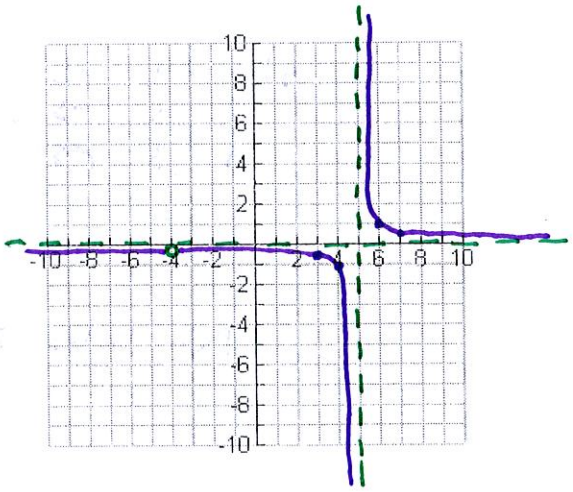
$-4 \mid 1 \;\; -9 \;\; 20$ → $1 \;\; -13 \;\; 72$

$y = x-13$

6. Use problem #5 to find its x-intercepts and y-intercepts x-int: $(4,0)(5,0)$ y-int: $(0,5)$

7. $f(x)=\frac{x+4}{x^2-x-20}$ $\quad \frac{x+4}{(x-5)(x+4)}$

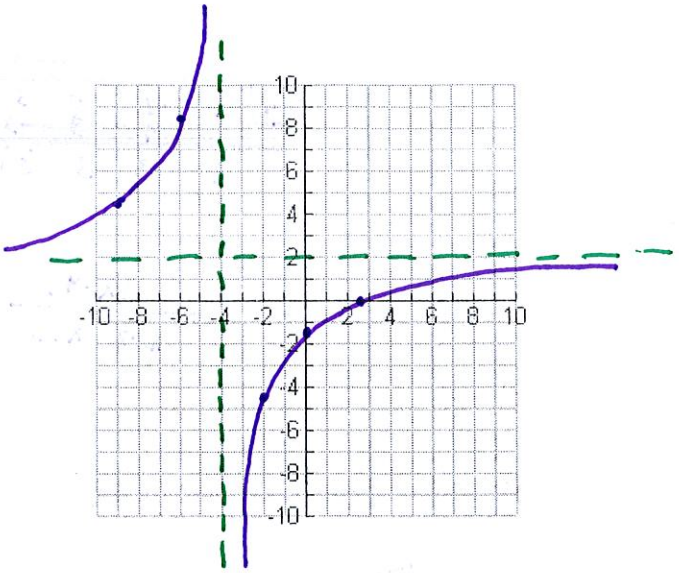
Domain: $\mathbb{R}$ except $x = -4, 5$
Range: $\mathbb{R}$ except $y = -1/9, 0$
Vertical Asymptote: $x = 5$
Horizontal Asymptote: $y = 0$
Slant Asymptote: None
Holes: $(-4, -1/9)$
x-int: None y-int: $(0, -1/5)$
INC: None
DEC: $(-\infty, -4) \cup (-4, 5) \cup (5, \infty)$



Name _____
Date _____ Day ____

8. $f(x)=\dfrac{2x-5}{x+4}$

Domain: $\mathbb{R}$ except $x=-4$
Range: $\mathbb{R}$ except $y=2$
Vertical Asymptote: $x=-4$
Horizontal Asymptote: $y=2$
Slant Asymptote: None
Holes: None
x-int: $(2.5,0)$ y-int: $(0,-1.25)$
INC: $(-\infty,-4)\cup(-4,\infty)$
DEC: None




9. Write a rational function that has a Vertical Asymptote at x = -3 and Horizontal Asymptote at y = 4.

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

10. Write a rational function that has Vertical Asymptotes at x = 1 and x = 2 and a Horizontal Asymptote at y = 2.

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

11. Find all the Asymptotes of $g(x)=\dfrac{x^2+4x-5}{x+1}$

VA: $x=-1$
HA: None
Slant: $y=x+3$

$$\begin{array}{r|rrr} -1 & 1 & 4 & -5 \\ & & -1 & -3 \\ \hline & 1 & 3 & (-8) \end{array}$$

12. Did #11 have any holes?
If so, where is the hole?

No holes in #11

GSE Algebra II – Unit 4C Review #2
Rational Functions

Name _____
Date _____ Day ____

13. Find all the Asymptotes of $h(x) = \dfrac{2x^2 + 4x}{x^2 + 5x + 6}$

$2x(x+2)$

$(x+3)(x+2)$

VA: $x = -3$

HA: $y = 2$

Slant: None

14. Did #13 have any holes?
If so, where is the hole?

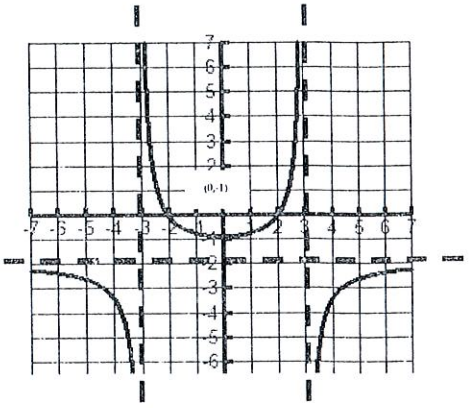
Hole @ $(-2, -4)$

15. What is the x-intercept and y-intercept for $h(x) = \dfrac{2x - 9}{(x+3)(x-1)}$

x-int: $(4.5, 0)$

y-int: $(0, 3)$

16. Find **horizontal** and **vertical** asymptotes of the rational function, **Domain**, **range**, **increasing** intervals and **decreasing** intervals



HA: $y = -2$ VA: $x = \pm 3$

X-int: $(-2, 0)$ $(2, 0)$ Y-int: $(0, -1)$

$x-3$ ~~$x+3$~~

17. Given $g(x) = \dfrac{x^2 - 9}{3x^2 + 9x}$, A. explain what is occurring at x = -3? B. What are the asymptotes?

$3x(x+3)$

a. Hole $(-3, 2/3)$

b. VA: $x = 0$
HA: $y = 1/3$