Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Guided Practice Rational Function Parts 1 Period\_\_\_\_\_\_\_\_\_

To assist in the comprehension of a common error area, I will employ some INFORMAL vocabulary.

EQUAL Degree = the highest exponent is the SAME in both the numerator (TOP of fraction) and the denominator (BOTTOM of fraction)

BOTTOM HEAVY = when a rational function has an exponent that is LARGER than all of the exponents in the DENOMINATOR

TOP HEAVY = when a rational function has an exponent that is LARGER than all of the exponents in the NUMERATOR

* When a rational function has EQUAL degree, then a horizontal asymptote exists and must be determined by the fraction created by the lead coefficients of the numerator and denominator
	+ $y=\frac{lead coefficient of NUMERATOR}{lead coefficient of DENOMINATOR}$
* When a rational function is BOTTOM HEAVY, then a horizontal asymptote exists and is y = 0 (the x axis)
	+ y = 0
* When a rational function is TOP HEAVY, then a horizontal asymptote does NOT exist.
	+ A slant asymptote exists when the difference in degree of the numerator and denominator is exactly 1
	+ An oblique asymptote exists when the difference in degree of the numerator and denominator exceeds 1

ALL ANSWERS ON FUTURE ASSIGNMENTS AND ASSESSMENTS MUST BE IN PROPER FORMAT

Lines are stated as lines and points are stated as points

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| BAD example1. $f\left(x\right)=\frac{x^{2}-4}{3x-9}$

X intercept(s) 2 or -2Y intercept $\frac{4}{9}$Horizontal asymptote ???? or blank Vertical asymptote 3 | GOOD example1. $f\left(x\right)=\frac{x^{2}-4}{3x-9}$=$\frac{(x-2)(x+2)}{3(x-3)}$

X intercept(s) (-2,0) or (2,0)Y intercept (0,$\frac{4}{9}$)Horizontal asymptote  NONE or this has a slant asymptote Vertical asymptote x = 3 |

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| To find the y intercept of any function 1. Evaluate the function at x = 0

To find the x intercepts of a rational function 1. Factor the numerator
2. Factor the denominator
3. Check to see if a hole is present FIRST
4. Cancel off any common terms
5. Set remaining factors from NUMERATOR equal to 0 and solve for x (these numbers are the x intercepts)
6. STATE as a POINT (x, 0)
 | To determine if a rational function has a hole 1. Factor both the numerator and denominator
2. Does the numerator and denominator have a factor that has a variable in common?
3. If YES on 2) then a hole is present on the graph of the rational function
4. If YES on 2) set canceled factor equal to zero and solve for x (this is the x of your hole and a domain restriction)
5. If YES on 2) replace x in NEW version of rational function with the solution you just found in 4)
 | To find vertical asymptotes of a rational function1. Factor the numerator
2. Factor the denominator
3. Check to see if a hole is present FIRST
4. Cancel off any common terms
5. Set remaining factors from DENMINATOR equal to 0 and solve for x (these numbers are the x values of the vertical asymptotes & domain restrictions)
6. STATE as an EQUATION x = \_\_\_\_
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| Intercepts & AsymptotesDetermine the intercepts and asymptotes of each of the rational functions (if NONE, then state so)1. $f\left(x\right)=\frac{x^{2}-100}{3x+15}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_1. $g\left(x\right)=\frac{20x+40}{x^{2}-16}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_1. $h\left(x\right)=\frac{-4x^{2}-24x}{x^{2}-36}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_ | 1. $j\left(x\right)=\frac{x^{2}-6x-7}{2x+14}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_1. $k\left(x\right)=\frac{x+1}{x^{2}-7x-8}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_1. $m\left(x\right)=\frac{x^{2}+2x-8}{2x^{2}-8x}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_1. $w\left(x\right)=\frac{x^{2}-2x-8}{2x^{2}-8x}$

X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Does this rational function have a hole? \_\_\_\_\_\_\_If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_ |